

This Old House



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Cover photograph by
David Barry



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In the March/April
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This Old House
MAGAZINE

View the 3D model of the Savannah restoration and walk through the renovated spaces—all yours for the view.

The Old House has traveled through Portland on its recent book tour. <http://www.publishers.com/TOH>



Letters

FROM OUR READERS

Could you explain why it is impossible to find a true 2x4?

John Gattanus
via e-mail

Unlike length, the thickness of wood is commonly measured in "nominal" dimensions, which are greater than the actual dimensions due to surfacing, drying and numerous lumber manufacturers. There are limits, however, to the difference. The American Softwood Lumber Standard (ALSS) specifies that a 2x4, for instance, must measure at least 1 inch to 1 1/8 inch less than name.

I've really enjoyed reading *Nora Alster's* book about building her dream home, but I was wondering why he painted his house two different colors.

Marty Boeks
via e-mail

He didn't. The cover of the book showed a work in progress. The tan on the front of the house is the final color; the gray in back was the primer coat.

In "Venetian Plaster" (September/October, page 88), you refer to a "plaster master." I refuted two hardware stores and a lumberyard, and they had never heard of such a thing. Who is it?

Don Carlson
via e-mail

A plaster master is specifically designed for drilling screws into lath; it is a perforated metal disk a bit larger than a quarter, with a slight curvature that helps spread pressure over a greater surface area. They're not easy to find, so try this company, which specializes in them: Charles Street Supply Co., 84 Charles St., Boston, MA 02114.

We would like to save an old home, but there is a lot of preservation societies or trusts where we can talk about purchasing an historic house?

J. R. Ellington
Chenango, Virginia

For 80, the National Trust for Historic

Preservation will supply you with a list of state or local preservation groups. To order, contact the National Trust for Historic Preservation, 1385 Massachusetts Ave., N.W., Washington, DC 20005, 202-675-6266. That magazine, Historic Preservation, also has a real estate section that lists only houses more than 50 years old.

My wife once lived in the house in Saint Joseph, Missouri, that you featured in "Save This Old House" (November/December, page 124). She says it's the house that created her lifelong interest in older homes. Any news?

Jane Parker
via e-mail

Dozens of potential buyers from all over the country have called about the house, and it has been shown many times—but so far, no sale. "Save This Old House" is now two for two (the North Carolina girls' school sold in October), so we have high hopes that this house will be saved too.

punch list:

- We hope that the Savannah House readers on page 110 of the November/October issue are not actually Victorian, since the house was built in 1915. The photo showed a type of window we couldn't find anywhere else.
- We apologize to anyone who read in actual Antique Tool Discovery Day at the Maine Historical Association, Portland, on November 12. The actual date was November 4.
- As our reader Jeff Bray pointed out, the upper-right hand photo on page 118 of "Antiques' Salvage" in September/October showed old door hinges, not the components of an iron door.
- "Give us the tools and we will finish the job," which we attributed to Franklin Delano Roosevelt (September/October, page 25), was actually said by Winston Churchill to FDR. Our thanks to Joyce Galloway of Clinton, New Jersey.
- We left out an interesting information for the South Box Changer (September/October, page 17), it is 896-139 and costs \$29 (see Book Guide, 231 Little St., South, CA 95412, 800-762-7321).



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 Editor@cmhouse.com

extras

"When we build, let us think that we **build forever.**"

John Sasaki

Photographs by Derrin Wedded

calendar of events

■ **THE BUILDERS' DINNER**, sponsored by the National Association of Home Builders, will be held in Houston January 26-28. Call 800-308-5242, ext. 111.

■ **CONTEMPORARY AFRICAN ARCHITECTURE**, home design and other topics will be presented at a winter lecture series sponsored by the Boston Society of Architects. Call 617-855-1433.

■ **THE JORDAN AMERICAN FOREST** conference considers our native forests and their future. February 20-24 in Washington, D.C. Call 202-430-5117.

■ **GLASS WORKSHOPING AND FURNITURE MAKING** are among the classes this winter at Harris Cityplace in Manchester, Connecticut. Harris also offers Freshrop and talks classes. Call 203-643-4063.

■ **RESIDENTIAL LANDSCAPE DESIGN**, an eight-week course at the Chicago Botanic Garden, runs from January 30-March 19. Call 708-636-6261.

■ **TECHNOLOGICAL DESIGN'S ADAPTATION: an American Institute of Architects forum** on the upgrading and reuse of existing buildings, will be held February 9-11 in Washington, D.C. Call 202-626-7482.

Name That Wood



Make a piece of wood to the U.S. Forest Service's new website in Madison, Wisconsin, and experts there will tell you what it is. The service is free to anyone (with a little of the sample is good). National Honey Alder says people send anything from a piece of King Heart's heart, lots of shape, selected off the coast of Florida. A million-year-old wood from Sweden. Big, shaggy from Mount Vernon. "Most kids of antiques," he adds, "and lots of antiques."

Seventy years ago, experts at the Forest Products Lab played the game used to help find a lumber. Today was made of wood from the prime subjects: white, spruce, red pine and oak, maple, birch, and other woods work in many forests. In identifying the species of a piece of lumber or a tree cut out from a tree, "it's not always a science of a lot of things," says Alder. "You're the owner, and a chunk of the wood, along with a better design when you know about it—whether it came from the soft or the green line, whether it might have been treated to resist decay. "Send us a reasonable-size piece," says Paige Miller, who supervises the program. "What we really do is kind of a board. The data is great, but we can't work with less. But if you have, then, really get a lot of it." Madison's Center for Wood-Working Research, Forest Products Laboratory (USDA Forest Service, 1 Office Products Division, Madison, WI 53705).

Homeowners On-line:

Looking for a copy of the manual for that special future is your basement? Want to compare real estate home plans? If you have Internet access, try pointing your questions to www.ahs.com/ahs/house, one of the newsgroups in that free Web-based thing called Usenet. Before doing so, get the Frequently Asked Questions sheet by sending in a post.

request to locate derivative files by zip code. Other strategies of interest are: compare home submission (home submission techniques) and check-out home submission (check-out building issues). The World Wide Web provides even more home-related resources via the Net, an e-bay of home's home. <http://www.ahs.com/ahs/house.htm> (the National Network Exchange Network, where you can find news from some major to visit the <http://www.earthlink.com/earthlink/>) and a listing of the best home sites, published by Money magazine. <http://www.earthlink.com/money/earthlink/> is more just a list. The latest part of surfing the Web is figuring out where to start, so check out the "standing links" page on our The Old House Web site <http://www.earthlink.com/TOH/> for recommendations.



"Hello, Arianna?"

Why risk \$900 million to run for the White House when for only \$8.5 million you can own it? Now on the market, this 22-room, 27,000-square-foot Georgian Colonial in Hillsborough, California, is a near replica. It was designed in 1878 in the style of a French chateau and transformed into the "Western White House" in 1900 by its then owner, George Hearst, who inherited his grandiose taste from his father, publisher William Randolph Hearst. Like the original, it has an oval office, cherry trees and even a checkered pool. The house nearly burned down in 1922, but had at least three fireplaces and has changed hands repeatedly. But unlike the original, it's available for immediate occupancy.



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CUBE's Evangelists

The guy lying on the sidewalk at downtown Fort Worth hasn't had one day's pay yet. He's pretending a Federal Reserve note is a shot of the expensive cocaine he's spending across the street. He and his fellow pedestrians are spending a "free afternoon" at a program run by CUBE, the Center for Understanding the Built Environment. A sort of urban architecture-education program based in Philip H. Kanes, CUBE founder. Kanes' hands-on education, a few white eggs, CUBE founder Garry Green's "tubular" arm, and a nondescript meeting room is a nearby hotel, attending a seminar at a National Trust for Historic Preservation conference. After his presentation on ways to teach children and our kids to live, understand and preserve the worthy buildings around us, Green (aka the group of teachers, architects, urban planners and family preservationists) leaves in his role of chief to play the "City Games." Reluctantly qualified for extensive training—Kanes, Whitehouse, Kanes' brother and one of the oldest pair of high heels—the Cubes will not, until several hours have passed in hand, Kanes' second rocks. In Southern Beach, a Southern Hotel design professor and a Tampa preservationist volunteer look to teachers, parents, parents and children on the street. A woman from Green's office gives her camera and her children a reward. "This is really hard," she says. "It's really to get them to take my kids out to look for Mediterranean details in one town." Mission accomplished. Green knows if her students pass the message on to children, part of the battle is won. The child started to looking for children on the sidewalk of Fort Worth. For example, Kanes there's a whole lot world to be discovered—and preserved.

—Steve Joseph Williams

Homeowners with polybutylene plumbing—plastic pipe installed mostly in the South and West during the 1970s—should know about the recent \$900 million class-action settlement with manufacturers Shell and Hoescht Celanese. The plastic fittings allegedly cannot be tested with the chlorine in tap water, which homeowners can recoup damages from losses and may qualify for replumbing. Call the settlement information line, 800-878-6868, for details.

Polybutylene Settlement



Testing for Wood Rot

Borrowing techniques from immunology, forest products researchers have developed a simple test for wood rot. Just keep, which can do as much damage to a house as termites but get less publicity, are difficult to detect. The wood rot test is as simple as a test, if the tip gives a, rot is suspected. But by then the damage is done. With the new test, a bit of wood cut from the wood is placed in the test solution and a strip is dipped in. If a blue line appears, rot is present. The test works even in the earliest stages of fungal growth—impossible because wood loses 1 percent of its weight to brown rot, the more damage level, can be weakened by 38 percent. Unfortunately, the test isn't yet on the market. Companies are working to produce a test in contact with Ralbach at the Forest Products Laboratory in Madison, Wisconsin, at 608-231-9382.



lightbulb/ night-light

Whom ever buying a lightbulb could provide family harmony? Not in the future from Philips Lighting Co. Can you live from 12 to 12 the level of a night light over 20 minutes—perfect for kids who can't fall asleep without a light on.



Mini Sanders

The Mini-Sander (59.95) uses the power of two AA batteries and the abrasiveness of industrial diamonds to further the edges of chipped paint, scrub oxidation from electrical contacts and solder joints and even write your name on other objects. (The batteries aren't included, but four diamond tips are.)

GOLDEN CARROT



Now it can be less costly to buy high efficiency washing machines. Thanks to the Consortium for Energy Efficiency's "Golden Carrot" program, some utilities offer rebates to consumers who convert clothes to 100%—when the federal government is expected to issue efficiency standards for clothes washers. If your machine meets the current standards and you live in Santa Clara, California, for example, Philips (aka A. Electric) will give you a rebate of up to \$225. The water utility adds another \$75, making the rebate rather than green deal at \$300 more than the rebate. With water and energy savings, buyers should look even in about three years.

"Huh? What?"

We're both to admit it, but our days of enjoying ear-splitting power tools just to mention making rock concerts are over. What we seek must be silence. And here's how we find it. Ear muffs (1) may be fun and bulky and get in the way of hats and glasses, but the Old House master carpenter Mark Adams and contractor Tom Slin prefer them because they're typically better at blocking sound than other types of protection. Foam inserts (2, 3, 4, 5, 6, 7, 8) are small, light and offer good hearing protection, but they're easy to lose (it's a thing called hearing). Show host Dave Thomas keeps his in a film container on his tool belt. Molded-plastic earplugs (9) are easier to insert than the foam variety and offer comparable hearing protection. Semi-inserts (10) don't protect as well as other varieties because they can't be fully inserted. But they're easy to pop in and out and hang around your neck when you don't need them. Prices range from 20 cents a pair for foam inserts to \$17 for ear muffs.



"Castles in the air... so easy to build."

Herbert Stein

Concrete Delivery



Anyone who's ordered concrete has probably wondered about how much to ask for. You can't make money. You can't win a prize. For a more relaxed approach, look for a company with trucks that keep ingredients separate during transit. Though not common, we've seen them both in the East before. The Old House worked on the Millard house in Madisonville, and in the West the one shown here was spotted in San Juan, California. On-site mixing means faster concrete and more working time before it sets. The truck must just the amount that's needed. Add trucks tend to be small, so they can get into backyards. Search the Yellow Pages for suppliers with "mobile mix" or "mix 'n' pour" services.



Semi-precious tile

Decorative, perhaps but like the three, made with semiprecious stone, were often used in the prisons of Europe during the 12th and 13th centuries. Now you can walk across floors decorated with light beige, marble, grey and red Jasper—8-year old tiles from Italy. 12 by 12-inch square costs \$28, 4 by 4-inch border tile \$148.

So long, cam-out

Sometimes even the most careful of us [that would be Norm] strips a screw loose its grip and "comes out." So we've enjoyed testing a product called ScrewGrab, designed to prevent cam-out. A drip of the gritty liquid on the tip of a screwdriver binds with the screw head—as long as pressure is applied. Releasing pressure frees the bit. According to the manufacturer, ScrewGrab increases grip by 400 percent. We can't vouch for this, but the stuff does work.



easy masking

By attaching thin plastic film to its popular blue masking tape, the 3M company has made it possible to mask off baseboards while covering the inevitable gaps between wall and drop cloth. Handy-Mask dispenses from palm-size rolls that come in lengths of 25 or 30 yards, the film is available in three different widths up to 35 inches. It certainly beats the alternate tactic: taping up sheets of newspaper or scraping little blobs of paint off the floor.

Attention Frank Lloyd Wright groupies



The Frank Lloyd Wright Building Conservancy's first annual auction, held in Wisconsin in October, gave disciples a chance to bid on everything from a weekend of the architect's "fallingwater" (left) in Mill Run, Pennsylvania (it went for \$70K), to a catering dinner for four at a privately owned Wright house. If those prices seem too feeble, consider the lucky bidder who walked out [for \$40K] with an actual piece of concrete trim from the Sogk house in Milwaukee. The conservancy will use the proceeds from the auction to help preserve the more than 400 Wright buildings across the country.

Frog wire

Extension cords often twist and kink after they've been coiled and unwound a few times. The Old House electrical regular Paul Kennedy reports that the FrogWire brand (it's green) stays flexible even in cold weather. It coils smoothly for him every time. (He also likes the integral name tag. No more "accidentally" walking off with his cord, guys.)



Lead encapsulants

The bad news: Title X, a federal law that goes into effect this year, requires all home sellers to test up if there's lead paint in the house. The good news: The law also lets homeowners use encapsulants, a new abatement method. Encapsulants are easily rolled, brushed or sprayed over lead paint. You are considered "lead safe" for the life of the encapsulant—20 years, in the case of the best ones.

Note that they can't be used in all situations (ship-ping and peeling paint, for instance). And most go on thick, so fine woodwork can't be covered without losing detail. But experts say encapsulants can save homeowners 50 to 80 percent of the cost of traditional techniques. Since there's no national standard, look for encapsulants that meet Massachusetts lead-program standards (see Directory) and contain an anti-ingredient such as bitrex, a foul-tasting additive to discourage kids from eating paint chips.

Radiant Heat Mesh



Richard Thierwey, our heating consultant, is fond of radiant floor systems—he installed one in the Salvo house to warm the bathroom tiles. But the bulky hot-water tubing is only practical when you're constructing a new floor. For retrofits, the Warm Touch system is an electric alternative with 14-gauge copper wires embedded in polyester mesh. A typical installation, sandwiching the mesh between layers of thin-set mortar, is only 1/4-inch thick and consumes 10 to 15 watts per square foot. Richard wouldn't use it as a sole heat source. "Electricity is just too expensive in New England. But it might be a good choice for week-end homes or guest rooms."

plastic nails

They're lightweight, they can't rust, they come in different colors and you can paint them. If you drive through ice, it won't damage your blade. Plus, their tensile strength (resistance to withdrawal) is as much as 15 times greater than that of smooth metal nails because they have withers to them. In that the end of the concrete nail itself has, yet, according to The Old House contractor Joe Shaw, who uses a few Super plastic nails. Their shear strength (resistance to snapping in bending) is about half that of a metal nail, so they're unsuitable for bracing. They can't handle shear, it's a little bit of a bummer. And they won't work on hardwoods or medium-density fiberboard (except on MDF). Joe says: "I don't know why they're just for thing for hanging siding, where about 100 lb isn't important but loading the elements is."



Save your old brushes

A good paintbrush never wears out, it just clogs up with dried paint. So here's a question: Why don't we clean brushes properly? What can we do with those stiff-as-a-board brushes that were never cleaned? And why should we keep shelling out the \$15 a decent brush now costs? Well, you may not have answers, but we've got Niles, a new paint stripper that cleans even hardened brushes like magic. It's the liquid version of the gunk stripper we used on the Salvo house porch (see page 52). A smelly solvent, Niles peels paint off brushes in 10 to 15 minutes—given those caked with modern paints like polyurethanes. It's also reusable (strain out paint that settles to the bottom). Not all paint strippers stick it yet, call 800-523-4114 for information.



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BY MARK FEIRER PHOTOGRAPH BY WAYNE SORGE

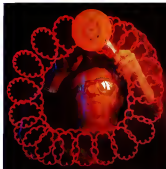
don't sand against the grain. That's the first woodworking rule people learn, whether sanding by hand or with a power sander. So you'll probably cringe the first time you sweep a random-orbit sander across a tabletop. But as the surface begins to smooth with no sign of scratching, you'll see that this tool ignores the rule and gets away with it. As

master carpenter Norm Abram says, "It's not a magic tool, just a lot more forgiving than any other sander."

A random-orbit sander incorporates two simultaneous actions: As the pad spins in circles, an offset drive bearing causes it to also move in an elliptical orbit. The motion isn't truly random (the photo shows how orderly it is), but as you work the two motions overlap, reducing scratching across the grain and keeping any swirl marks to a minimum.

Versatility is another random-orbit hallmark. The tool can strip paint like a belt sander but is easier to control. It can finish like an orbital sander but without grain-direction worries. And because it can suck up and remove dust through holes in the pad, a random-orbit sander is great where ventilation is lousy. Says Norm, "This tool is starting to dominate my sander collection."

To snap a "random" orbit, a tiny offset-powered light was slipped into a hole covered modeling pad. The photographer suggested this shot as the sander operated against a sheet of Plexiglas. Exposure: 4 seconds at f/16.



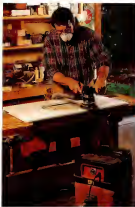
Elements of Sanding

When it comes to finish sanding, a random-orbit sander is only as good as your patience. The most common mistake Norm sees is the failure to spend enough time with each grit. "You have to start with coarse and work your way up to fine, but if you don't sand thoroughly at each stage you'll see scratches at the end. Before changing grits, Norm always sweeps back and forth across the entire surface with overlapping horizontal strokes, then re-covers the territory with vertical strokes.

"I start with 80 grit to strip a finish on solid wood," he says, "otherwise the first step is 100 or 120 followed by 150. I stop there if the surface will be painted. If I'm staining, I go to 180 grit and then 220."

A random-orbit sander and silicon carbide sandpaper are ideal for taking scratches out of sanded-surface cocacore (right). The process generates extremely fine dust and a minute amount of styrene vapor, so a vacuum or a fitted, NIOSH-approved dust respirator is a must.

Some in-line and palm-grip models (see page 37) will sand wood if you're not careful. The pads start spinning as soon as you pull the trigger, but the rotating casters don't lock in until the tool is in full contact with the wood. In that moment of transition, the sander can leave an arc of scratches where it first touches down. Many newer sanders have features that minimize stalling, but Norm still thinks it's best to start these models while they're flat against the wood. Because random-orbit generates a lot of dust, some have a bag or canister to collect dust sucked through holes in the sanding pad; a vacuum hookup is even more efficient. Norm's shop vac starts automatically when he turns on the sander.



The Papers

The right sandpaper is crucial if a random-orbit sander is to deliver top performance, but lots of options make choosing tricky. A sanding pad will accommodate hook-and-loop (Velcro-type) or pressure-sensitive adhesive (PSA) discs, but not both. Hook-and-loop discs can be taken off and reattached as often as needed; they're the best choice if you change grits frequently. Hook discs are less expensive, but you can't reattach them. A disc comes in 3- and 6-inch sizes to match the pad diameter of the sander. A dust collection suction if the vacuum holes in pad and sander don't line up. Discs can have as few as 8 holes or as many as 16, so make sure the ones you buy fit your sander. • For go/no-go placement it's easy to tell, straight. Norm sighs through the paper's holes as he presses the disc into place. • The sandpaper's backing—what the grit is stuck to—is usually paper. Lightweight backings ("A" weight) are best for finish sanding; heavier backings ("D" or "E") are for heavy-duty stock removal at medium to fast speeds. Unfortunately, most manufacturers don't show the backing weight on their packaging. • Uncoated aluminum oxide is the best abrasive for raw wood. On painted or sealed wood, use aluminum oxide discs to minimize clogging.

Sanding Across Grain Is No Problem

The eccentric movement of the sanding pad lets you disregard grain direction entirely in most fine-tune on furniture and cabinet projects. For example, when sanding this dresser he built out of recycled antique pine (right), Norm hardly paused as he sanded the sander into the breastboard edge. His only caveat: "Just don't go too far off an edge or you'll round it over when the sander tips." Cabinet doors (below left) present a similar situation. The grain changes direction where stile meets rail, but a random-orbit sander slips over the intersection. The wood panel in this door stood slightly above the surface—until Norm took them down with the



random-orbit, the tool is actually efficient at sanding end grain. On square surfaces hold the sander flat to keep it from sliding off one edge or the other. You'll notice most vibration with a random-orbit sander than with other types. It takes some practice to get the touch just right, particularly with powerful right-angle models. Sanders with variable speed settings give you the most control. A random-orbit sander won't fit into corners fully, so you will have to finish them off by hand or with a detail sander. Descender to lift, not drag, the vacuum hose over your work. As Norm kept the hose way, the ride on the hose can snap many wood edges.



Choosing a Random-Orbit Sander

Palm-grip models (A) are the lightweights of the family (and usually the least expensive). They're easy to hold against narrow surfaces, such as cabinet face frames, and they maneuver like sports cars. Pads are 5 inches in diameter, most except in vacuum attachment. Right-angle sanders (B) have arms that link their powerful motors to the sanding pad. This increases torque and reduces stalling speed. The tool is a bit wider (but more expensive) than the others, but you can push it hard without straining it down—a plus if you're shaping a rail or smoothing a gluing surface. With a lighter touch and fine sandpaper, it also makes a great finish sander. Flat-touch pads are most common, but Norm prefers the greater coverage of 6-inch models. An in-line sander (C), with its motor already over the pad, is traditionally identified by a palm-grip handle in form, however, have features that improve their ability, including stronger motors, variable speeds, handles and 9- or 10-inch pads.



Window Glass

The right choice can make all the difference in comfort and peace of mind

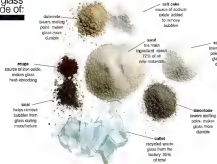
BY JEANNE HUBER PHOTOGRAPH BY DARRIN HADDAD

"Fantastic" is the word researcher Charles Greenberg chooses to describe glass, the material that captivates his curiosity. Glass can be bent, colored, shaped, strengthened—and still remain transparent, durable and cheap. No wonder it's found in virtually every building in the modern world. "If it didn't exist, we'd have to invent it," says Greenberg, senior scientist for flat glass development at PPG Industries, a Pittsburgh company with 68 glass factories worldwide.

But for all the magic of glass, it's a raw material whose properties must be manipulated to what type it is in the window. This is why window salespeople say, even when consumers shop for replacements. Maintenance and ease of cleaning matter, the glass itself is taken for granted.

Yet the choice of glass actually has a great deal to do with what it's like to live in a house. It can allow us to see that greengrass view to the west or fence us to draw the drapes to escape the heat. It can mean the difference between coping up with a leak in a window seal or shivering there.

what glass is made of:



be shut down, a pool of glass would harden near the furnace and have to be pulverized out. Other building materials can be produced to meet demand, but a glass line stops out a common 680 tons of material every day. "The glass keeps coming out, and we have to sell it," says Michael Rogers, manager of new business development for flat glass at PPG.

Today, homeowners have a lot to choose from when they install new windows or retrofit old ones.

Those who go with standard glass, whether in new or existing homes, get a product with a slight greenish tint (because of iron content). The glass will let in most of the sun's energy: 98 percent of visible light, 40 percent of ultraviolet (the short-wave radiation that degrades fabrics) and 79 percent of infrared (long-wave radiation that causes objects to heat up). It will break in a shatter of chunks by a baseball or a burglar or subjected to the intense heat of a fire.

Other glasses are in different. Low-emissivity glass, developed in the 1980s, offers the most dramatic temperature control with the least change in appearance. Made by coating glass with an invisibly thin layer of silver or an oxide, this type allows most visible light to pass through but reflects heat or heat, keeping rooms warmer in winter.

A variety of "low-e" glasses are available for different situations. When summer cooling costs are most significant, buyers can choose glass that reflects most of the sun's heat. But where free solar heat is an asset, they can use glass that admits most of it. Windows with different characteristics can be chosen for different exposures of a house.

Low-e coatings can be either pyrolytic, which means the metals are applied while the glass is still molten, or added later. The latter are often called

"soft" coatings because they scratch more easily. Since soft coatings tend to give better thermal performance, they're good inside double-pane windows. Pyrolytic coatings are the only way to go for storm or single-glazed windows.

Other, older ways of limiting heat from the sun—tinted and reflective glass—are not as well suited to homes because they change a window's look. But styles may change. PPG is conducting a marketing survey to find out what range of tinted glass homeowners are in the market of they leave the building. Glass with slightly more green than normal, for example, admits most visible light (83 percent) but blocks nearly half of ultraviolet and 45 percent of infrared.

Besides solar considerations, glass can be selected to resist breakage, as it's used in windows and doors. Often this is done by laminating thin plastic film between two sheets of glass. By using low-e, tinted or reflective glass for one or both of the layers, it's possible to get glass that has several advantages.

This is true with insulated glass too, which has an air layer between the panes to keep heat from moving by conduction (physical contact) and convection (air flow). With the right glass, it can deal with radiant heat and security issues as well. Not all companies offer all options, so shop around.



hot stuff

Because flat glass becomes run unprotected for years, any replacement must be fired in the kiln. This is a job for the "hot workers," who wear specially designed clothing made of a fire-resistant material called Nomex. "The heater you dress, the more time you get," says Andy Gualtieri (of right above), working with Terry Sanderson to replace a batch of window glass at PPG's factory in Erie, Pennsylvania. They're often called on to fix 50-pound firebricks into place, a job made harder because the bricks must be the exact size of the opening in the

Window Glass Options



"clear" glass

Standard window glass (A) is what we're used to. It's cheap and in warm climates is still the best choice for windows that don't get a lot of sun. We're so accustomed to it that we barely notice its growth time. But for use in solar collection, **low-iron glass (B)** is better. It has no green tint and more solar energy gets through if you don't want to see yourself when you peer through a window, pick glass with a reflective coating (C).



reflective glass

Standard reflective glass (A) can keep sun-drenched rooms from heating. But it looks like mirrors and makes windows look like mirrors. Not for one house, but maybe good for a museum or office. **Low-reflective glass (B)** is great for homes. It cuts in almost all light as standard glass but reflects infrared energy to keep rooms warmer in winter. It can be made to reflect or admit infrared heat outside. The only drawback: It's more expensive than we're used to.



insulated glass

Insulated windows (A) which combine mass of any kind of glass, help keep heat in or out of a building. Home owners find with product heat the two panes apart, creating an air layer in the middle. That space, combined with air or other inert gases instead of just air acts like insulation in a wall. **Heat Mirror glass (B)** insulates better as well because it's made by superimposing a transparent shield of plastic with heat-reflecting or air space, creating glass-insulating layers.



safety glazing

Where people might fall through, building codes require glazing that won't cause injuries if it breaks. Tempered glass is one option. Another is **laminated glass (A)**, with a thin layer of polymer bonded between two layers of glass. This sample has a five-eighths inch between two-PVB layers. **Lexus (B)** is a plastic, is a low-cost alternative. Say it only with a scratch-resistant coating. It's available with insulating air chambers (C), but they're very a little.



PHOTOGRAPHS BY DARRIN HADDAD

switchable glass

This is the perfect glass for folks who want a conversation piece or make obnoxious drapes. Switch it on (A) and Privacy Glass changes from opaque to clear. Turn it off (B) and it's back to sunny white. It's made of a thin film of liquid crystals. Usually in motion under they line up when the film is charged by electricity letting you see through the window. The glass has no significant energy savings. Could glass be made to change from switching to blocking the sunlight of the flip of a switch? Maybe, but don't bet for it now.



heat-resistant glass

A regular window can't stand during a fire, allowing flames to spread. In institutions and other places where it's crucial for glass to hold together, a traditional solution is now-embedded glass. But with glass and alternatives like wire-

less Superflex (A) can still hold enough radiant heat to prevent windows to get caught on fire from the inside. Not Superflex (B) or the lower gel layer made of a polymer containing still and water actually absorbs heat. After 60 or 80 minutes depending on thickness, the surface

side will remain below 250 degrees. Perfect for buying for homes in fire-prone areas. But other dispensing is more important. **Retard-Lite (C)** is the ultimate in heat glass. Laminated to meet impact, it's intended mostly for process and petrochemical hospitals.



tinted glass

Tints can be functional or purely decorative. Some absorb heat and block ultraviolet radiation. Thanks to the **metallic oxides** that happen to color them green, gray, blue or bronze (A). For looks alone, windows can be made any color by **laminating** one or several layers of plastic between sheets of glass (B). Tinted glass looks stronger in old homes but could be great in some spots in newer ones.

bad-guy glass

Standard laminated glass resists impact, but it can't withstand bullets or repeated punches. **Security** or **Police** or **Police** for those of us whose children want playing ball outdoors. The product, **armor** has a five-eighths inch thickness. It's the thickest in production. It can be ordered in colors or as a one-way mirror.

Strengthening glass

PHOTOGRAPHS BY GUY AROON

To understand why glass behaves as it does, you must understand its atomic structure: nearly random and completely featureless. This explains why glass differs from most building materials in the way it deals with heavy loads. In metal, for example, atoms or molecules line up side-by-side, allowing the material to deform, even to the point of being permanently reshaped, before giving way completely. But in glass, a jumble of bonded silicon and oxygen atoms and a sprinkling of other ingredients are locked in place. If pressure exceeds the strength of those atomic bonds, the glass breaks.

Curiously, the theoretical strength of the bonds is about 100 times greater than the actual strength of window glass. The reason is that even the smoothest-looking glass contains minuscule small flaws that can open into wide cracks when pulled apart. That's why glass is "cut" by scratching a line on one surface and then either tapping or snapping the free sides apart.

To strengthen glass, manufacturers increase the density of atoms at the surface, the added pressure keeps any surface flaws pushed tightly closed. The most common method of strengthening is to heat pieces of glass and then cool the surface faster than the core. Tempered glass has a surface compression 75 times greater than regular glass, heat-strengthened glass, which is made by a similar process, has a surface compression 30 times greater. It's also possible to chemically strengthen glass, sodium atoms near the surface are replaced by slightly larger potassium atoms.



ARON: Snap test checks for distortion in newly tempered glass at PPG's Carlsburg factory.
LATE: He tests a piece by twisting it. For safety, fully tempered glass must break into small cubes instead of large shards. When falling cubes might be a problem, heat-strengthened glass is a better choice because it holds together more when broken.

At the test lab

PHOTOGRAPHS BY BRIAN SMITH

After Hurricane Andrew stormed across southern Florida in 1992, building officials began requiring that windows be fortified against hurricane-force winds. Storm shutters or covers are one option. Another is extra-strong glass in sturdy frames.



In hurricane glass the way to go? For most homes, no. One, it should hold together if broken in a storm, protecting against catastrophic damage. For homeowners would sell be left with expensive replacement bills. Shutters or covers that protect glass are another.



ARON: Laminated glass, made with a polycarbonate impact layer in the middle, passes the Q-1 test. This glass is similar to that used in automobile windshields.
LATE: Tempered glass fails the hurricane test. The pulling hole would allow wind and water to enter the house.

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Phone and Data Wiring

It pays to plan for services you don't yet need

BY PAMELA KARTFORD PHOTOGRAPHS BY GARRIN HADDAD

the demand for phone wiring—your home office, your kid's e-mail address, your spouse's Internet habit—forces many homeowners to think about adding second and third lines. In most older houses, that means adding confusion—unless you have a strategy that makes economic and functional sense.

When Norm Abram built his new house, his son, Bob Pitard, laid in a simple system—star wiring—that allows for flexibility and future expansion. Norm's literary agent, Don Cutler, recently hired Pitard to design a similar system for his 1846 Greek Revival house in Salem, Massachusetts. Cutler told Pitard: "I need four lines—business, personal, dedicated fax and modem for my office—but I also want to be able to answer calls in the kitchen, use my modem on any floor and check e-mail in my dressing room. Can I do it?" Here's what *This Old House* learned about adding lines to an older home.



These are the wires to run to your walls: "four-pair" (left), which carries eight wires to color-coded labeled jacks for four phones or fax lines; category 5 high-speed twisted-pair (middle) for carrying data on a computer network; and coaxial cable (right) for hooking up your cable television.



The equipment connectors: the RJ-11 (left), which can be used to deliver two phone lines through one jack; the category 5 connector (middle) for computer networks and high-speed phone services like ISDN; and the coaxial cable connector (right), which assembly may also run video into your computer.

Wiring Topology

ILLUSTRATIONS BY JOHN MURPHY



DAISY-CHAIN WIRING

Most older homes have daisy-chain wiring, also known as series or loop. One cable comes from the network interface box (where your house's wiring connects with the phone company's) usually found in the basement and runs in a chain from one jack to the next. If there is a break anywhere in the line, everything downstream goes out. To add lines within this system, new wiring must be run from the interface box. This can follow the existing daisy chain or a new route to the desired jacks. Drawn: lots of spaghetti, broken red and blue breaks or bad connections are hard to locate.



STAR WIRING

Star or "home run" wiring is more flexible. With this system, cable bundles run from the interface box directly to each jack (notice the points of the "star"). Extra phone, video and data-network wire can be included in each bundle, even if it's not currently needed—a smart choice since wire is cheap and obsolescence expensive. "The wire outlives the equipment," says John Salda, a telecommunications consultant in Boston Ferry, New York. "Put good cable in the walls, and even when it's extremely convenient to do while the technicians are there." With star wiring, breaks in a line can be isolated and repaired faster.



The Hub

All Don Cutler's wiring is organized through this hub board. The phone company's network interface box (A) has two halves. The wire pairs from the main cable run from the terminal block on the right half to test jacks on the left. Bob Pitard ran Cutler's four lines into an AT&T Partner panel (B), a business telecommunications system that links the phone lines to the desired house extensions and can be programmed to provide an array of features: paging, conference calling, call transferring, a door intercom and on-hold music. Pitard added the cross-connect block (C) to augment the system so multiple lines could be bridged into one extension. Category 5 high-speed wire for the separate computer network is coiled at the bottom.

In the Basement



Bob Brown, a Wayne technician, helps a 6-line "drop line" cable from the pole to the house. Drop lines carry 1, 2, 6, 12 or 24 lines. But more than just lines, you don't have to run another cable if you add a line. The phone company is responsible for the lines only up to their interface box. Once the lines are inside your house, you may hire a licensed electrician or telecommunications expert to do the wiring. (Telecommunications tend to be expensive, charging from \$30 to \$45 an hour.) Telecom experts can charge \$45 an hour or more.)



Bob Pitard puts up the base module for an AT&T Pomer system, the same kind The Old House host Dave Thomas installed in his own home. "This system extends all through the house, so we can answer our land line from all over and use the paper and telephones," Stone says. "If you're looking for something to last you a decade, a business system is the way to go."



Pitard does some prep work to make routing the wires up the walls as problem-free as possible. For each phone extension, he bundles together the necessary wires, then adds extra for future phone call data lines can be bundled up without the expense of adding the home. He then tapes together each bundle, carefully labeling both ends with the designated extension number so no lines get crossed.

The Glossary

Bridging: Combining several lines into one extension at a connecting block, or splicing an incoming line to two separate lines via a bridge splitter at the jack.

Connecting block: A plastic block containing metal terminals for connecting groups of wires. The block has insulation-shielded connections, which means you can connect an insulated wire ("punch it down") without having to first strip off some of the plastic coating.

ISDN (Integrated Services Digital Network): High-speed technology that permits two-way conversations plus data transmission, all at the same time, on home wiring.

Network: Computer equipment connected by cable. Local area networks (LANs) such as Apple file and Ethernet carry data within offices, homes or campuses. Separate from telephone wiring, but can be run at the same time.

POTS and FANS: Plain Old Telephone Service (phone company line for basic single-line telephone service) and Pretty Amazing New Stuff (free services such as ISDN).

Quad wire: A cable consisting of four unpaired wires (green, red, black and yellow), adequate for standard analog telephone service only. To use business-system features such as call waiting, hold, barbs and conference calling, it should be replaced with twisted-pair wire.

Topology: The configuration of a wiring system. Two main topologies are the star and the daisy chain.

Twisted-pair wire: Copper phone wires bundled in color-coded pairs, usually four to a cable. Each pair is twisted at a different rate to prevent interference from other pairs. Twisted-pair can handle more current and future telecommunication possibilities, such as all-digital phone service.

In the Office



(1) Only one ungrounded electrical outlet served the new home office, and there was no phone jack. The closest offered access to the heating duct, a handy shortcut Bob Pitard used for pulling up the cable from the basement.



(2) Bob Brown, an electrician familiar to The Old House viewers, and partner Joe Trunking lift up the old pine floorboards, exposing the old-fashioned knob-and-bolt wiring. They "fish" new electrical lines along this channel to the corner of the room. (3) Pitard's "pull" from the basement need go smoothly as the cable doesn't get pinched, knotted or stressed by too much pressure on the way up.



(4) Pitard connects the wires—"punches in the plug"—for the fax line on the terminal block. The second pair of the four-pair cable, for phone use, gets punched in next. The third pair is for the modem, and the fourth is an extra line for later. An independent pair of category 9 high-speed wires for the data network is punched in at the bottom of the terminal block for convenience.



(5) When the wall plate gets up, loose under the outlets include which line to which (top left, phone; top right, fax; lower left, modem; lower right, data network). Wall plates for phone and network jacks come in a variety of configurations, including those with coiled cable outlets for video equipment. Electrical outlets should be contained in their own housings.



The finish

Jacks have been installed in the center of the floor where a large work table will sit, allowing for greater accessibility. A 20-amp dedicated power circuit was added, with outlets for lighting as well as a line amplifier. "A 20-amp circuit can handle three computers with modems and a printer with power to spare," says telecommunications consultant Andrew Barabon. "I recommend a dedicated circuit for computer system peripherals. It greatly reduces wiring problems associated with having multiple appliances running on one outlet." (It does not, however, eliminate the need for a surge suppressor.) The printer is plugged into the data network, sending messages to the household working from different rooms. New phones come from an authorized secondary market vendor at a significant savings. Total cost for materials, components and labor to wire a computer network and four phone lines into six rooms: \$4,410.

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Choosing Hammers

A well-equipped toolbox is full of them

BY STEPHEN PETRANEK PHOTOGRAPH BY J. MICHAEL MYERS

S

ometimes you have to wonder: How does the brain do that? How can you pick up a hammer that weighs more

than a pound, swing it through a huge arc at such an awesome speed you could crush the skull of an ox and then land it squarely on top of a dot of steel? That's beautiful.

"It's a mighty good feeling when you do it right," says *This Old House* contractor Tom Silva. "You can always tell an amateur. He doesn't swing, he tries to push the nail or punch it, he tries to do it with his wrist instead of his arm, he misses and he hits his finger. That's ugly."

Pretty or pathetic, a guy without several hammers is a guy without tools. Master car-

penter Norm Abram has six quite different types in his toolbox. Tom can get by with three for general contracting, but if he starts



working with metal or chipping bricks, he's got to go back to the truck for more.

For every job that requires some sort of pummeling, there's a specific hammer that makes it easier, safer and better done. But even with the right hammer, there's style to consider. When it comes to a standard carpenter's hammer, for example, Norm likes a solid steel

model with a leather-wrapped handle

Tom prefers a fiberglass handle with a rubber grip, and Russ Morash, the show's director, can't stand to swing anything that isn't plain wood. "There is nothing," he says, "as elegant as wood."

It took some getting used to, but now Tom Silva is using about this Yamauchi with a long burst back and a curved handle. "It has extraordinary balance," he says, "and this thing handles like you just got your best into it for driving nails."

ten for the toolbox

CARPENTER'S

Designed to offer help, it should never be used to deliver metal blows such as shoring or hammering masonry walls. This close-shaft design is safe at 150 pounds. Tom says the best all-around weight is 15 ounces.

BOAT BUILDER

The punchy, flat head is used to assemble joinery. Imported from Japan, the hammer is a favorite of boat-builders. Tom says the flat head is the user's choice.

BALL PEIN

Primarily for shaping metal, "there's nothing like it for working metal," Horn says. Can also be used for driving cold steel rivets and steel punches.

Tips from Norm and Tom

1. Look for a hammer with a forged steel head. Tiny particles of metal tend to chip off over time, and go flying in all directions.

2. Carpenter's hammers with curved claws pull nails better than straight-edge models and help protect amateurs from striking the claw into their hand on the backswing.

3. Avoid hammers with waffle-vent heads. A single blow that slips off the nail and onto a thumb is sure to send you to the hospital.

4. It's a good idea to have a leather-shod hammer head to slip, rough it up with sandpaper before using it.

HOW TO HAMMER A NAIL

A beginning nailer shouldn't require more than two steps to position it. Horn says, "When you hold the hammer to sink it. A common mistake the novice makes is to stand directly over the nail, and swinging his head as he raises the hammer. Another frequent error is gripping the hammer too high up the handle. Try this: Stand back, grip the hammer low and firmly, then swing from the shoulder instead of the elbow. In a half arc, 'there it is,' Horn says, 'visualize to keep your eye on the nail.'

RIP

Also known as a fork or a ripper. Most have a straight claw that can be used as a nail puller. A better design shows a wide, flat, curved claw that can be used to pry out a nail from a board.

TACK

The perfect tool for setting small nails. Used by old-time carpenters to set the first nail in a board. It's good for driving large nails into wood.

SHOULDER'S

The small, curved claw is used to pull out a nail and a flat, curved claw is used to pull out a nail. It's a good tool for driving large nails into wood.

MALLEY

To many, the all-around best for wood-carving tools. Usually used with a sandpaper of wood. Also good for breaking wood-laminate sheets and for joining.

BARREL

A flat head with the handle of the handle, offering more control when chiseling. Heads are tempered to be soft on the inside and hard on the outside, reducing rebound.

DEAD BLOW

Usually used with wood or metal to absorb the impact of the blow and keep the hammer from rebounding. Particularly useful in tight spaces and for assembling delicate items. The one has replaceable faces. Horn thinks it has great success.

SPLIT-HEAD RAWHIDE

Used with a mallet for the beginning. Used to break apart old construction when wood is to be used or to assemble delicate items. From a mallet.

oldies but goodies

There are more hammer patents in the books in the United States than in any country in the world, says Horn. The first, the claw hammer, was patented in 1794. The first, the claw hammer, was patented in 1794. The first, the claw hammer, was patented in 1794.

Square-faced finishing hammer used by silverworkers and copperworkers for smoothing surfaces. Finding between all metal, with a pry bar for fitting fence staples. Driving hammer for pressing out dents in sheet metal. Double-screw hammer patented in 1902. This design pulls wire without bending them, the upper claw starts the lower one follows. Ramping hammer: an auto-body tool modified to remove hula hoops.

New Life for an Old Stove

A rusty castoff becomes the centerpiece of a new kitchen

BY JEANNE HUBER PHOTOGRAPHS BY DAVID BARRY

dave Erickson was heavy where others are may be expect great performance where others assume mere and less. For 17 years, Erickson has been restoring old stoves, from tiny parlor heaters to the most ornate kitchen ranges ever made. He started in the 1970s by fixing up his own stove, drawing on skills from his job as a shop teacher for the deaf and blind. Word got around, and by 1983 he was in business full-time in a funky old train station in Larison, Massachusetts. In the early years, customers mostly wanted a way to cook and heat with wood, prior for other fuels were scarce. Nowadays, Erickson's customers generally have been out shopping for commercial ranges, which can cost thousands of dollars, and are drawn to because Erickson's stoves also are heavy-duty but

with character. He's often asked to convert wood- or coal-burning stoves to gas or electricity, which causes minimal disruption to the look. "Everybody at the 1920s and '30s did this," Erickson says. He specializes in combination gas and wood or coal ranges, such as the 1920s Major New Republic being restored here. He and his crew completely rebuild it, adding new nickel plating and a safety gas-shutoff valve

Now it gleams as the \$3,000 centerpiece of a kitchen in Concord, Massachusetts.



Arrest: Erickson sorts in his workshop, marking sure metal parts don't get lost. Nickel Plating covers the stove, but the temperature gauge, a nice feature, is intact.



Erickson found the stove in a basement in Cape Cod, where it had been sitting for so long that a floor had been poured around it. The stove was coated with speckled concrete.

Stove history

The first stoves at this century were made of wood and heat with coal, clay or brick. Cast-iron stoves weren't produced in quantity until the early 1700s, but it took



Regent
Earlier stoves were self-heating from coal fire at top.



Madison Square
Top of the parlor stove had elaborate air flow, firing brick.



Bono
Early range was just firebox and oven.



Southeast
Cook-wood range had low warming oven, water tank.

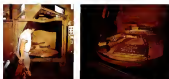


Luxury
Cast-iron heater heated eight bidders' bank.



The 300-pound stove is moved in gleams. Here, the top stove head for repair.

Sandblasting



Sandblasting is the quickest way to clean rust and mold-riddled stoves from sand and parts. When Erickson started out in 1949, he had his own sandblasting equipment. Greater health and safety rules nowadays tend him to use a third's shop, where his guys go by the hour to use an enclosed machine loaded with steel shot. He compares it to a microwave oven: "You put the rusted piece of garbage in there for two minutes, and it comes out brand new!"

Nickel plating



Nickel plating became popular on stoves in about 1945, after chemists discovered a trick to sticking nickel to iron. First apply a coat of copper. "The copper is sort of like a primer coat," Erickson says. It also lets dry ricks and level the surface; any scratches that still show can be fixed with silver solder before the nickel is added. After about 1950, nickel was largely replaced by chrome because chrome doesn't tarnish. Nickel requires plating in a few inches of acid, but the chrome is the only way to go. "The only time I recommend chrome is when people live near the coast," Erickson says. To remove tar, he suggests a powdered steel bead. Dull or a gentle rub with superfine steel wool.

Painting and adjusting



After touch-up buffing with a disk-mounted wire brush, Erickson employee Keith Ammendt sprays the lower oven door with black stove paint. The Gempsey Paint Co. in Everett, Massachusetts, developed the formula after Erickson pleaded for a high-temperature paint with a satin glossy finish—"not flat, like enamel paint." Inside Erickson's shop, where a layer of black dust seems to coat everything, Tim Willy adjusts the thermostat that controls the temperature of the top oven, which he just put (and with new stainless-steel bowls). The old steel bowls were badly rusted. Ammendt and Willy then assemble the stove, coating all the joints with a material developed for bonding linoleum.

How stoves were made

We measure old stoves partly because so much burner energy went into making them. From extracting the ore to making the furnace, stove-making was a gritty, muscle-intensive business. It's no wonder that the faces staring out in century-old stove foundry photographs, like this one from Peckskill, are inevitably either young or unhealthily looking.



Peckskill workers with double-theme casting flasks.

Stove-making started in the woodcrafter's shop. Each piece was carved separately, with intricate girth sometimes formed in wax or plaster. Carvers borrowed freely from architectural motifs of the time, which is why many early stoves look like miniature buildings. To cast both sides of patterns, molders used two-part flasks, or molding boxes, that opened to reveal impressions made by the carvings in the clay-like molding sand. Some businesses had hundreds of these boxes, and molders spent days preparing them. When the foundry floor was filled, the cupola furnace was fired up, and a glowing ribbon of iron began to flow out. Men moved back and forth with ladles of molten iron, filling mold after mold. Burners were castable, as were large diameters from the silica and smoke. When the pieces had cooled, the boxes were opened and the parts dumped off. After a trip to the finishing room for a final touch-up, they were ready for assembly and sale.



Iron flows into ladles in one of the last furnace shops in Peckskill, about 1950.

It's all in the thermostat



Old gas stoves often cook better than new ones, Dave Erickson says, and the reason has little to do with what they're made of. Modern ranges have "sag thermostats" dimensions, which shut off the gas when the temperature rises above the target level and turns it on again when the oven cools. Temperatures may swing 35 degrees above and below the goal. Mouldering thermostats, like the Magna's 1935 Wilcoless (above), regulate temperature by using two materials that expand at different rates when heated—in this case, a carbon rod inside a copper tube. Because copper expands faster, gas flows freely at first. As heat increases to the desired level, the carbon expands, slowing the gas supply and keeping the temperature constant. When thermostats were new, cooks were used to working by observation, so the Wilcoless has both temperature and "doh" markings: 400 degrees, or "mac'n, cooking, apple pie." —Ben Kelen

The final result



The finished product: three working ovens, eight burners and a heater, all fired by gas. The top oven allows precise baking without heating the lower one but an extra burner for heating. The lower oven, warmed by the heater, has a temperature gauge but no thermostat. It heats to about 350 degrees.

Property Taxes

How to understand—and contest—your bill

BY WILLIAM MARSANO PHOTOGRAPHS BY MELANIE ACEVEDO

Recently we and our neighbors have been getting letters from property-tax representatives suggesting that we're paying too much tax. We'd like to know what our assessment is, but we're afraid to ask. We'd like to reduce our tax, but we're afraid to ask about that, too.

—Letter to This Old House

Few of our members in an American tradition: They're major donors, right up there with unions and mortgage bankers, and like other donors, they're a subject of folklore. "If you light the altar you'll probably win," an old-southern saying of home-owner faith, is only as true as folklore usually is—i.e., not very. But you can win if you are assessed and can prove it.

Here is a home-owner's view of how property taxes work. An assessment came with your house, it was set long before you bought the place. It may since have been adjusted (diverged just a tick) or completely redone, and it can change again upward or downward in the future.

It was calculated by assessors who estimate properties' market values and then determine the "level of assessment" in the community. Technically speaking, they "discover" that level by comparing selling prices of houses with their assessments. If the average price is five times the assessment, the level of assessment is 20 percent.

Here's a simple comparison: A house's current market value (\$139,000) multiplied by the level of assessment (20 percent) produces a \$27,800 assessment for tax purposes. Applying a tax rate of \$100 per thousand dollars produces a tax bill of \$2,780.

In some areas assessments are up to date due to townwide revaluations (some states require them every few years), or others they may be decades old. New assessment values may be 100 percent of market value, old ones a mere fraction—but it often doesn't matter as long as the town treats all homeowners equally (see page 48, "Some Numbers Don't Count").

The relevant figures are on your tax bill. If you pay tax as part of your mortgage payment (as is common these days), you may not get a bill or even a statement, so call the assessor's office for the details. You'll get an answer in minutes—probably not from the best himself (he'll be too busy hearing widows and orphans) but from some clerk who hasn't taxes as much as you do.

The same house can have many different values at the seller's asking price, the buyer's purchase price, the lender's replacement value... and the assessed value for property taxes, which may not have changed in 20 years.



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Reducing your tax bill isn't easy. Assessment levels and tax rates, being commissions, are maddening, not exact. The discretionary figure on the town's budget and your assessment. Reducing the budget might require a certain rebellion against property taxes; a lower assessment, on the other hand, can be negotiated directly with the assessor. Convince him that yours is unfair and you'll serve—but remember, the burden of proof is on you.

Assessors' offices handle enough protests that many provide useful brochures to help you mount a challenge. (New York State, for example, provides a 40-page booklet and supplementary instruction forms.) If you want to see what your neighbors are paying, check the tax roller. They're a matter of public record, open to all. That is, in fact, how the property tax representatives—who make a living by winning tax reductions for property owners—picked our reader as a possible champion.

Next, get a copy of your property record card, which contains a detailed "inventory" of your property—because area and size of lot, number

of rooms (and their sizes) in your house, improvements (such as freestanding garages and other outbuildings), type of construction—so short, a very full description of the thing being taxed.

Close examination may reveal technical errors. Assesment measurements may be inaccurate, and the room count could be wrong if you have reduced living space (for example, by demolishing a structurally unsound one-bedroom addition that wasn't worth the cost of repair). Maybe the record shows an in-ground pool when yours is actually above-ground, or lists a detached garage when all you have is a carport. Such errors are grounds for a reduction that cuts your tax bill.

HIRING A TAX GLADIATOR

The letters our reader got suggesting that she might be overtaxed came from property-tax representatives (PTRs) offering (for a fee) to do battle on her behalf with her local tax authorities. Should she hire a gladiator? Should you?

First, discuss your assessment informally with your assessor. "Most people would rather go to the dentist," says assessor Richard O'Donnell, "but those who nerve themselves to find I'm

YOU'RE ASSESSING WHAT?

Totally, anything that increases the value of your property is tax assessable. "When lands are assessed," says Richard O'Donnell, an assessor in New York's Westchester County, "if you have your wood-paneled interior, a bathroom, a fireplace, I could assess you—that I won't. It's too much of a judgment call. The arguments about how much value it adds would go on forever. A new roof could be assessable too, but it's also a maintenance item. Five assessors will get you by taking proper care of your most important asset. Putting in a fancy new kitchen might result in no upward adjustment, though."

"Right" is the key word. In some cases, assessors don't protest when you actually increase your living space. An ordinary garage porch won't cost you a cent, but a second, waterfront porch suitable for use as a bedroom or study could.

And some improvements don't add value at all, in the assessor's eyes. Adding central air conditioning to a house in Florida wouldn't be assessable. It would be viewed as merely improving the home up to local standards, because so many other houses there already have it.

"Homeowners who are planning major improvements should see their assessors," O'Donnell says. "We can tell them how or whether their property claim will be affected and save them unpleasant surprises."

second \$5,000 in property taxes. Simple arithmetic proves his level of assessment is 25 percent. If the tax rolls show everyone else is at 20 percent, he can demand a similar reduction, cutting his tax bill—at least temporarily—by \$4,000.

"It can be worthwhile to investigate if you live in an area that has become highly desirable and suddenly gets a lot of new growth," says John Steward, an appraiser in West Shore Lake, Michigan. "That's where errors of omissions happen because sometimes get caught in a general tax increase." Their reluctance may be ripe for challenge.

One of the least successful grounds is a drop in the overall

market. Another of our readers, who paid \$485,000 during the '80s property boom, influenced after making \$46,000 into her house. The market had collapsed since she bought, so the bank's appraisal was only \$40,000—less than she paid and far less than her actual cost. On paper, she'd lost 28 percent of her investment. Could the per-house assessment cut by 20 percent?

For chance. Unless her assessor, like the Maytag apartment, is stored for compromise, he'll say no. If he doesn't, every other similarly afflicted homeowner will demand a similar reduction. The only way to make up the missing budget shortfall will be to raise the tax rate, leaving everyone exactly where he started.

Nevertheless, "the assessor must give you a hearing," says Westchester County, New York, tax official Andy Jackson. "The mayor can refuse your call, the town clerk can decline to set you, but the tax assessor has to hear you out. Grievance apps and appeals procedures are a matter of law."

But here's the caveat: Property taxes are local by their very nature, they vary greatly from place to place. "General rules? Universal?" says Bob Ciamoff of the International Association of Taxing Officers. "Around here, we don't see 'typical.' We see 'big' and 'large.'" But he did offer some guidelines...

Seven of spot assessments (possible tax reassessments), also called "welcome, stronger" valuations because the buyer is shocked with a

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higher assessment after he closes. They're illegal in some states and, says Ciamoff, "near policy everywhere because they go against uniformity." Fortunately, he adds, "they're not used—by and large." But check at the assessor's office when buying.

Ten protests can be simple, and you can appeal if not satisfied. "You can start with an informal conference with the assessor—a conference, really," Ciamoff says, "and get your answer right then." Even formal appeals can often be argued without outside help. Beyond that there may be one or more state review boards and judicial reviews, for which you could require the help of an appraiser or a lawyer. You can also hire someone to do battle for you (hire a Tax Gladiator).

You may not get a reduction or not win, but—by and large—you can't lose. If a review shows you've been underassessed, no harm done. "The assessor didn't want to be seen as punishing those who protest, so they won't tell you for their mistakes."

Write for the International Association of Taxing Officers' free booklet, see what brochures your state's tax office has or order and don't be afraid to fight. Taxes won't make America's top of ten, remember—and haven't since December 16, 1773.

SOME NUMBERS DON'T COUNT

When some homeowners learn others' assessments are revised downward, and well, naturally too, they may demand a similar revision. Their hopes of greatly reduced taxes are high—and often brought low by the facts. They usually have few assessors to sue, even if they're much more recent, assuming the assessor has done his job well and showed little of unusual assessment.

But what if the assessors do go wrong? They tend to make mistakes and make them more difficult to correct. When a house's market value is \$200,000, it can be hard to show that an assessment value of \$300,000 is too high. Revaluation to 100 percent of market value challenges assessors.

Requiring assessors must reassess rising prices. Say the \$200,000 house now has a 100 percent assessment of \$200,000. The old tax rate (\$20 per thousand) would quadruple the bill, producing an unwanted budget surplus and homeowner bankruptcy. The new assessment level requires a tax rate cut of 80 percent to \$20 per thousand.

But we're not out of the woods yet. Town officials don't like reassessments. They're tedious, expensive and emotional projects. And low-income revaluation of all properties—commercial included. "Very often," says an assessor speaking anonymously, "commercial properties are grossly overassessed, in the belief of subsidizing residential. Revaluations can expose that situation—and business would remove it. Residential sales and/or paying more. Residential sales are where the voters are, so most officials would not believe otherwise possible."

Wheatley, who admits to being his New York State village's "official tax-gauger for the past decade," recalls a PTR who won a reduction for a dozen homeowners in a relatively new housing development: "The challenge also helped those in the same development who hadn't protested," Wheatley says. "They were also overassessed, and they got adjustments automatically."

When considering a PTR, make sure the firm

will take your case on contingency: no tax reduction, no pay. When successful, PTRs usually charge 50 percent of the first two years' reduction. The catch is that it's payable immediately—the homeowner has to wait for his savings—and that can sometimes be a problem. "One woman called asking me to please not reduce her taxes any more," says O'Donnell. "She said she couldn't afford to save any more money."

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This Old House

A LETTER FROM THE **Salem Project**

In 1969, *This Old House* undertook the restoration of an 1850s post-and-beam barn. We planned to dismantle the structure timber by timber, save those in good shape, replace those in poor shape and re-erect the frame. As it turned out, every timber in the barn was rotten or filled with powder-post beetles. We pulled the whole thing down, saving only four knee-braces and a handful of pegs, which we used in the new frame.

"So how can you claim the barn was a restoration?" people would ask. I'd answer: "Ever hear the saying, 'This is my grandfather's car. My dad replaced the head and I replaced the wheels'?"

Like the original barn, the new timber house was raised piece by piece, a group of craftsmen fastened each joint by hand and then together raised the house on the old foundations. Its form was true to the original. So, I agree, the barn was restored. I concede, though, we recreated it too, by adding a kitchen, bedrooms, a heating system and elegant living space.

Most of our *This Old House* projects are a combination of conservation and restoration. One of the best examples is the current project in Salem, Massachusetts. The house was built in 1714, with two rooms remodeled in high Federal style during the early 1800s. Stepping onto these rooms, you inhale the air of a time when Salem was one of the richest cities in the United States and no ships could be found from Anchorage to Zanzibar. Some people believe such historic houses should not be altered in any way. But houses exist for living in.

The new owners, Deborah and Kevin Ganses, have three small children and two full-time jobs. They like most of all to relax in a modern kitchen and enjoy modern bedrooms, laundry facilities and adequate lighting and heating.

The front parlor and bedroom of our old house inspire particular respect, with masterpieces loaned courtesy of Samuel McIntire, the "architect of Salem." It would be undesirable to alter these rooms, and so, with advice from the conservators at the Peabody Essex Museum and the Society for the Preservation of New England Antiquities, we will lovingly restore them. The more historical rooms will be conserved. When we are done, the house will have regained its balance.

My own house, a post-and-beam North House, was built (as far as I can tell), in the late 1700s. It was moved to the site in 1816 and was added to in the 1840s. Around 1914, it was added to again. The house's style has been transformed several times, it's now a Georgian Colonial. In 1958, I renovated. The facade and the front rooms are "original"; I didn't alter a thing. In the rear of the house, though, I installed the modern kitchen and other amenities we needed.

Some years hence another owner will change the house again. That's okay. It will still be the same house, as long as the work is done with respect—for the original design, for the craftsmen's hand and for the fact that the house has stood on the earth for longer than we have and will likely stand far longer still.

This goes to the heart of the notion that we are not owners of our houses after all but stewards. Respect for an old house means knowing what to conserve and what to convert, and how to do both. The best teacher is often the house itself. If we only pay attention, our old houses will teach us much of what we need to know.

Steve and the Ganses family (Kevin and Kevin, who's at work in Salem)



Steve Thomas

A PORTICO SAVED

20 GALLONS OF STRIPPER
50 HOURS OF SCRAPING
DAYS OF EPOXY, PUTTY AND PAINT

BY STEPHEN PETRAMSKI PHOTOS BY WILLIAM VAZQUEZ

Painter John W. Dee stroked the 150-year-old wood column as the portico of the Balent project house, dug into the pocket for a knife and poked at the thick coating. He looked at Norm Abram and guessed, "15 or 20 coats of paint here?" "I'd say that's conservative," Norm replied. They inspected the rot in the base of the tall pine columns where water from a leaky roof had been collecting and shook their heads. Then Dee stood back, looked over what he termed a "very needy" project and saw something else. "A piece of fine exterior furniture." Although the portico would require a month of solid work and cost \$6,000 to restore, Dee knew it would be worth the effort.

When you take a prominent space and treat it with impeccable craftsmanship, it makes for an impressive welcome to guests in a neighborhood like this, you have to preserve the architecture, and the portico is the most significant architecture of the house.

STRIPPING

House restorers had to spray more than 20 gallons of chemical stripper (at \$22 a gallon) on the portico. It took about 20 coats of paint to get off on the first pass. The super-thick paint came off in the second pass. Water-based paint requires European-made strippers that bubble paint and remove it to the spray gun, where it is mixed with a very small amount of acetone. A father, Dick Westbrook, president of the company that distributes the solvent-based products, says the two prefer spraying it on in applications with a brush or drop technique. He says he applied some evening, less of the stripper goes on the next and the air is injected at the gun trigger. It is done, making it easier before. As soon as the paint underneath started to bubble, the hard work of scraping—50 hours' worth—began.



SCRAPING 1 AND SANDING

(1) Although Dee usually uses his hand scraping tool that has two interchangeable blades of varying shapes and sizes, he will try anything that works and has become known for having weird tools. "The most intricate architectural detailing on that porch is called guttae. Latin for drops," he says of the fine carving on the frieze above the columns. "Detailed teeth were essential to get to these." Scraping was followed by sanding with 100-grit paper (2) to get into the horizontal grooves near the top of each column. Dee wrapped a

special scraper with sandpaper and perked it into the slot. He says that the scratchings produced by 100-grit paper are usually filled in by exterior primers, but to get an even smoother surface, he sanded the porch a second time with 100-grit paper (3). A random-orbit sander was used on flat surfaces and he gave a fine edge to the rim on the columns.

(4) After sanding, Dee removed the rotting wood in the base of the Doric columns with a hand-held router connected to a variable-speed motor seen as a wand here. Just to be sure the tool would not fall down as the bottoms of the columns were routed away, he braced it with a 2x4. He was especially concerned that the rot in the base of the columns had destroyed the structural integrity of the vertical joints running down the middle of every other rib. To prepare for filling with epoxy, he masked up about 12 inches at each joint, allowing all of the filler glue and disintegrated wood



3



4

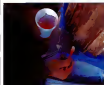


FILLING 1

(1) After routing out all the rot, rotting wood. Dee tested the columns with a moisture meter. If there is even a hint of dampness the epoxy may seal it in, allowing the rot spores to continue consuming the wood. After epoxy will not bond with moist wood (2). To increase adhesion and avoid air gaps, Dee first applied a slurry epoxy that penetrated the wood and ensured a good bond with the thicker epoxy filler (3). When the epoxy primer had set for about 20 minutes, Dee mixed a thick epoxy that is resistant to sagging (4). The epoxy emerged green and clear from the two tubes but turns amber colored when properly mixed (5). After laying down plastic film to mask the joints, Dee applied epoxy into all the holes he had routed in the columns. On that 80-degree summer day, it set up so fast that he had to do all the necessary shaping within five minutes. "The sooner you get it where you want it, the better" he says. "The more you try to mold it, the more it will sag." He used three-way plastic putty knives to apply the epoxy and shape it to the column's dimensions. A several applications filled in any voids. After the epoxy cured, Dee sanded out any imperfections. After primed the end so joints with the slurry primer. Although he felt the epoxy was essential to a better fix, he was taken aback by its price. "It costs \$10 for a quart tube and we used 17 just on the porch."



2



3



4



5



FINISHING 1

Two steps one of the most important steps of a restoration project is preparing the surface with Swedish putty, a filler made in-kind of fine ground limestone dust bound oil. "It's remarkable stuff," he says. "The Sutherland family in the Netherlands has been making it for 300 years. It takes three weeks to grind the limestone fine enough, but it will fill an indentation as small as a pin scratch."

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For Directory see page 176 or search and online

trash shed



WHAT'S IN THE GUINEES' GARBAGE?

In Salem, site of the current *This Old House* project, trash is culled every week, recyclables every two weeks. Before designing the Guineaes' trash shed, we measured their output:

- three 15-gallon bags of trash (including disposable diapers)
- two overflowing bins of cans and bottles
- one blue recycling bag of newspapers

BY PAMELA HARTFORD
PHOTOGRAPHS BY J MICHAEL MYERS

The average American produces almost three-quarters of a ton of garbage every year. Multiplied by a family of four, that's a lot to haul to the curb. Although efforts have begun to reduce the amount of trash we create, changing our habits will take more than a generation, says William Rathje, a "garbage archeologist" and author of *Rubbish! What Our Garbage Tells Us About Ourselves*. Rathje is optimistic that we can meet the challenge: "No society in history has been better equipped to deal sensibly with large amounts of garbage than ours," he says.

For the Guineaes, current *This Old House* homeowners (five people, 3.28 tons of garbage per year), the problem isn't in the kitchen. Like most towns these days, Salem, Massachusetts, mandates not only separating recyclables from general trash but also separating paper from glass, plastic and metal. While this policy has saved Salem (population 38,000) \$419,000 in disposal costs over the past two years, it has cost Deborah Guinea a lot in aggravation. "I need to get the cans out from underneath," she says. She plans to streamline the sorting process in her new kitchen with a pull-out bin for cans and bottles and a basket near the back door for newspapers. For the rest of the trash, a compactor helps manage bulk; the Guineaes use it a few times a week, producing a packet of trash weighing about eight pounds.

The next step is creating a place outdoors where the garbage can wait for pickup. *This Old House* master carpenter Norm Abram designed a trash shed that met several requirements: It had to be nice looking, economical to make, child-proof, rodent-proof, easily opened by an adult with one free hand, well ventilated, easy to clean inside and big enough for two recycling bins and two 30-gallon trash barrels on rollers, which Kevin Guinea will haul out for weekly collection.



materials and design

"I'd just built a large storage shed for a New Yorker Workshop project, so I had some design lessons in mind when the Gurnees asked about a shed shed for their yard," says Norm. "We agreed on the location—along a fence near their back door. I drew up some plans, which they approved, and Kevin suggested adding a shed along the inside back wall for some prime tools."

Tongue-and-groove cedar siding clarifies the sides and doors for a clean, uncluttered look. The double doors on the left are held closed by a slide bolt and so sagittal, a strip of wood on one door that overlaps the other. A door on the right opens to the divided recycling door. The roof is high in front, giving better access to the base and allowing rainwater and leaves to slide down the back. The doors close flush against the shed frame. For easy walk-down, the interior is covered in plywood sheathing.

Norm built the shed as one day, relying on his sliding compound miter saw, nail guns and circular drill. While Norm was constructing the shed to the Gurnees' backyard, Kevin had the mix dug out and filled with gravel to create a level foundation with good drainage. The finished shed was covered over and set on gravel paving stones to raise it above ground level.

TOTAL COST OF MATERIALS: \$545.

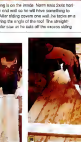
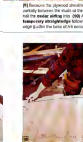
Materials used include cedar siding, plywood sheathing, tongue-and-groove cedar siding, galvanized hardware, stainless steel nails. For a complete materials list, see the Directory on page 106.



how to build it



(1) Norm sets up shop in the Gurnees' backyard. Using his sliding compound miter saw, he cuts joists and builds the floor joist. (2) The floor is set on shims to compensate for the uneven surface. The back side of the shed is made of exterior-grade plywood, which he attaches with temporary stainless-steel lag screws driven flush to the surface.



(13) With all the sides and back boards installed, the roofing can go on. A prefinished drip edge goes on the top and bottom. The layout of the shingles was calculated so the pattern remains flush across the entire roof. (14) To prevent water from running under the top drip edge, Norm runs a bead of caulk between the shingle and the drip edge.

(15) With rain beginning to fall on the ground, Norm left the tongue-and-groove boards of the 2x6s in air. Rain and board girths often sit tongue or groove removed. (16) The 2x6 is made of 1x3s arranged in place, attached with 10-inch prefinished deck screws in predrilled holes.

(17) The door hangs on 3-hinges, which Norm installs while the door is still on the worktable. The key to hanging a 2x6 door is to place the door hinge on the side of the door where the 2x6 diagonal meets its butt joint. This will prevent the door from sagging.



Drive ways

Never underestimate

even the most carefully planned driveway. Built right, it can be wide enough to handle a parade of pickup trucks, delivery trucks, and graded gravel and sand trucks. Then a rest. A good driveway also serves as the first line of defense for weeds.

Start by pushing the dirt from the road to the edge. Straighten the driveway, and grade it. Add a few inches of gravel or more, and grade again. Drive a straight line. At least 10 to 12 feet wide at the entrance and 10 feet wide at the exit. The Old House landscape architect Tom Wirth says the driveway should be 10 to 12 feet (or larger) space at the entrance for turning around, then provide an equal parking. To make sure there's enough room, do what Tom does: Make a wide circle at the end of the driveway first. He adds the middle around on the drive and make sure the turning radii are generous.

Prevent puddling by angling the paved surface slightly downhill. It should be brown. The center of the drive is built up so water flows down the sides into the soil or drainage channels.

A drive that's too steep is slippery and dangerous. Never exceed a rise of 15 feet per 100 feet or a decline (a slope of 15 percent). If the driveway must wind up a steep rise, add curves to lessen the rise and cut the time of travel.

The driveway should reflect the character of the house and the landscape. If the driveway is a simple, it should also stand out. The driveway should be a good one. It should be a good one.

Like a country road,
the driveway should hold up
under traffic and fit
the landscape

BY ANDREW TABBARD
PHOTOGRAPHS BY ERIC RANK

THE SURFACES

concrete



PLAIN

COST \$2.50 to \$4.50

Provides a low maintenance, level surface that's easy to pour, pour, pour for least cost and slowest to install. Concrete will stain and crack, so sealers with exposure to road salt.



PAVERS

COST \$4 to \$12

Cost concrete units, available in range of colors, come in interlocking shapes that make them easy to install. If a paver is damaged or broken, it can be replaced without disturbing the entire driveway.



PIGMENTED

COST \$4 to \$5

Colors (there are hundreds to choose from) are mixed into the concrete or dusted on while it is wet. The latter yields stronger hues, but might reveal a gray beneath.



ACID-STAINED

COST \$2 to \$3

Acid penetrates the top 1/8 inch of concrete to impart color. Multiple colors may be sampled to give the appearance of stone. Colors fade and wear over time.



STAMPED

COST \$4 to \$8

Wires mats pressed into wet concrete leave texture that imitates cobblestone, slate or brick. The concrete is typically stained or pigmented as well. If not done right, the result looks tacky.



EXPOSED AGGREGATE

COST \$4 to \$6 to \$10

A layer of concrete is washed from the surface to reveal the color and texture of the aggregate (gravel) beneath. The proven surface promotes freeze-thaw damage, acrylic sealer protect.

stone



CRUSHED

COST \$0 cents to \$7.25

Chief advantages are low cost and rustic look. Type of stone varies with location. It's often made from sandstone or granite. Polished form really shines in gravel or stone without stripping away stone.



COBBLESTONE

COST \$7 to \$14

English stone (just granite) is available in smooth river rock is expensive but looks pretty. Plots about up through installation. Uneven surface makes snow-cleaning difficult.



GRAVEL

COST \$5 cents to \$1.25

Peaked surface is easier and less and less feet than peagot crushed stone. Requires a border to hold it in place and a filter, ground cover to prevent plants from sprouting through.

asphalt



PLAIN

COST \$1.25 to \$2.50

A mix of aggregate and asphalt laid over a gravel base. Must be sealed regularly with asphalt emulsion to prevent oxidation. Difficult to get neat-looking edges.



STAMPED

COST \$3 to \$5

Wires mats pressed into fresh asphalt leave a textured surface that looks like brick. Can be deformed by heat and pressure, so with stamped concrete, the best often looks like.



CHIP SEAL

COST \$2 to \$3.00

Gravel is rolled into a sticky top layer of asphalt emulsion. The surface has more texture and color than plain asphalt, but stone will get loose when with freeze-thaw cycles and plowing.



COLORED

COST \$2 to \$3.50

Peaked pigment dissolved in an asphalt-based sealer provides color. Pigment may be reapplied every 2 to 5 years as color breaks down with wear and weather.

brick



PAVERS

COST \$7 to \$10

Hard fired bricks are attractive and stand up well to traffic, but irregularities in the surface make it susceptible to weather damage. Inconsistent shapes and sizes make it hard to install.



CRUSHED

COST \$5 to \$8

Used for garden paths, crushed brick crumbles to dust with wear. It's pretty, but hard to clear snow from without taking up a lot of the material. Not readily available in truck drive country.

so long, snow

Installing a snow melt system means never shoveling snow to pavement again. Hydraulic systems work by circulating water and glycol antifreeze through plastic tubing (cross-linked polyethylene, which won't break down when exposed to hot water) called beneath your driveway. The water/glycol solution is heated to between 120 and 130 degrees, enough to warm the surface. Supply and return manifolds (left) send water between the system's lines to the driveway and direct cooled return back to the boiler. The tubing runs on expanded polystyrene board for insulation. The circulating water—any type will work—can be heated by a hydronic system or installed manually (see tip on left at the first sign of snow) or automatically in sensor keeps track of air temperature and moisture. Installation by a plumbing and heating contractor, including labor and materials, runs about \$0.50 per square foot. Repeat every five years. A driveway on a windy north slope will require more tubing than one with a protected, or sheltered exposure. Electric snow-melt systems consist of a grid of heating elements installed beneath the driveway surface. These systems and up to 100 ft power, making them less popular.



THE CONSTRUCTION



Of all the various driveway materials, concrete is among the most practical. As long as cracks are sealed properly and salt isn't allowed to collect on the surface, a concrete drive will hold up for 15 years or more. Also, snow is easy to plow—no important consideration here in Colorado, where snow plowing season lasts for 8 months out of the year. This new concrete driveway will get an exposed aggregate finish, which shows the texture and color of the gravel sand is the mix to show. The look is rustic, pebbly and subtler than a monolithic grey slab. Different ready-mix suppliers

use different types of aggregate, so select your supplier according to the look you want. (1) The 18-year-old contractor added with sealer, is broken up with a hydraulic jackhammer and leveled away. Concrete and asphalt can be pulverized and mixed so needed, the gravelly base for pavement. (2) The ground is leveled and finished with a "jumping jack" compactor. Whether the driveway is concrete, stone, brick or asphalt, the ground beneath must be flat and stable for good results. If you've got clay or other problematic types of soil, consult with a soil engineer. (3) Forms

made from 1x6 boards are staked in place to shape and hold the concrete. These will be removed about 24 hours later. (4) A 4-inch layer of roadbed is poured, leveled and compacted once again. This creates a firm base for the concrete. The roadbed also helps insulate the pavement from freeze-thaw movement in the ground below. In some parts of the country, where the soil is sandy or filled with clay, roadbed may be laid as thick as 12 inches. The soil here, just west of Denver, is relatively stable. (5) To add strength, wire reinforcing mesh (16 gauges) is spread over the drive. It will

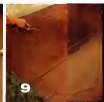
be lifted into the concrete as the slab is poured. You can forgo the mesh by specifying a concrete mix that is fortified with plastic fiber. If the base is poor, steel reinforcing rods (rebar) can be used to strengthen the slab. (6) Concrete is poured to a depth of 4 to 6 inches, depending upon how much traffic the driveway will carry in some communities. Codes dictate how thick the driveway slab, as well as the roadbed, must be. Check with your building department. As a rule, the thicker the concrete, the stronger the driveway.

(7) A screed (in this case, an aluminum bar with handles) is used to distribute and level the concrete. The surface is then worked with a float, which resembles a trowel, to make it smooth and to release any excess water that has risen to the top of the pour. Insulators must be careful not to overwork the concrete. An "overworking" too much water leaves a chalky surface and compromises the strength of the slab. (8) Using a 2x4 as a guide, wooden plates are cut with a circular saw, which resembles a

trowel with a blade in the center. At this point the concrete is firm enough to support some weight but still wet enough to be worked. The plates, which divide the drive into 8 ft by 8 ft foot squares, give the concrete a place to expand and contract. The idea here is that the concrete will crack along the joints and not in the middle of the slab. If cracks do form elsewhere (usually due to shifting soil or an insulator issue), they must be patched to prevent water from seeping into the concrete and

eroding it. (9) A chemical retarder that has sugar as a primary ingredient is sprayed on the surface to slow the setting time. The retarder prevents the top 3/4 inch, allowing the concrete underneath to set at its normal rate. (10) A film of plastic is laid on the driveway to keep the retarder from evaporating and to protect it in case of rain. (11) Two to 15 hours after the retarder is applied, the plastic is peeled back and the driveway is hosed down with water. Fine cement particles and sand are washed

from the surface, exposing the aggregate beneath. Then a multiacid solution is applied to clean the stone. The resulting, an acrylic sealer is sprayed on to protect the surface from staining and weathering. The sealer also insulates the surface against damp, bringing out the color of the aggregate. For best results, the sealer, which is available at home centers, should be reapplied every 2 to 3 years, depending on weather conditions in about 15 days. The driveway is flat enough for traffic.



COMFORT

MAKING AND MANAGING HEAT AT THIS OLD HOUSE WITH

Quikrete Polymer concrete ready to pour from into the Quikrete forms. Quikrete forms in two footer lines meet at the tip of the guy, they produce the desired shape that acts as the framing apart. The form is made, but when it expands 100% longer, the concrete expands to cover the gap and seal it. The form.



Learn insulation day at the 'Old House'. The showman and machinery stay on the truck; only the easy house go inside. Kevin Richard Trefeney and heating contractors Richard and Bruce Wile arrange the way better into the basement.

CONTROL

INNOVATIVE EQUIPMENT AND "LEAK-SEEKING" INSULATION

Messed by its historical assets, Salem, Massachusetts, is a very rich town. In its oldest neighborhoods, narrow streets are lined with one treasure after another, spanning the 17th, 18th and 19th centuries: saltboxes, Colonials, Federal, Victorian—a fine of traditional North American architecture.

The corner Elm Old House pentax at 124 Federal Street was a perfect example of Salem's riches. But like the town's many other unadorned gems, it had some major flaws—especially when it came to energy efficiency. Take away its unique value, and the place was some 3,000 square feet of substandard: breasting with countless air leaks, poor insulation, facing single-pane windows and thoroughly inadequate heat. Creating real maintaining comfort was an expensive and difficult challenge. The two-pronged solution—Seal and insulate the shell and put in a high efficiency heating system. Both were done with innovative materials that represent bold options for houses new and old.



BY JOE CARTER PHOTOGRAPHS BY KELLER AND KELLER

MODERN

HEAT

In the Gutters' new heating system, two tanks of water are the part that will warm the bathroom floors. The supply manifold just above allows hot water from the boiler to radiantly heat floors underneath the tile floors in each of the two bathrooms. When the water cools to heat, the return manifold (above) collects and retransmits it into a single line for the trip back to the boiler.

THE WAY PLUMBING and heating expert Richard Truhenwieser sees it, most of America's home-heating systems are outdated reproductions of technology that's half a century old. "For decades, we've been using systems to handle what's called the 'always temperature,' then adding 10 to 100 percent more capacity on top of that," he says. "The design temperature in Boston is minus 10 degrees, but it's only that cold less than 3 percent of the time. The rest of the time, you're got boilers and furnaces running at maximum output to meet much lower heat requirements. That's like running your car with the pedal down and constantly leaving the brakes!"

Richard has a few other perks about the way homes are heated and cooled,



The two: Richard Truhenwieser and Bils, install the new microprocessor-controlled boiler for three families' warm-air water floors and hot water.

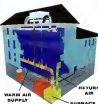
but he can also point to readily available solutions. Many are included in the new system at 124 Federal. For example, an exterior temperature sensor raises and lowers the water temperature in the boiler, and the hot water is continuously circulated—most streets and stopped—to provide just the right amount of heat and greater comfort. "For every three degrees you lower the boiler water temperature, you burn 1 percent less fuel," says Richard. "If the average temperature is 150 instead of 180, that's a 20 percent savings right there." Better controls like this, he says, are "the next quantum leap in energy efficiency."

HEATING: SOMETHING OLD, SOMETHING NEW

Illustrations by Brian Garrigan

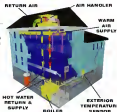
This Old Furnace

Before the Gutters bought it, the house on Federal Street was badly heated at all, and what heat there was was linked to a first-floor doctor's office heated by a conventional forced-air system powered by a gas-fired furnace. To hold down renovation costs, the Gutters decided to reuse the system serving lower floors. The old furnace is only 60 to 70 percent efficient and augment it with a new high-velocity heat system serving the second and third floors. Later on, when the furnace finally quits, they'll replace the new system and heat the whole house at maximum efficiency.



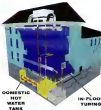
High-Velocity Heat

Compared with the old furnace, the new heating system seems positively state-of-the-art. It starts in the basement with a microprocessor boiler, a German import with several innovative features. The hot water it makes is pumped to a water-to-air heat exchanger (air handler) in the attic. This is where a unique high-velocity forced-air system takes over, pushing warm air through 1/2-inch ducts at four times the speed of a conventional system. (For more about this system, see the following pages.)



Warm Floors, Hot Showers

In the second-floor bathroom, the heating is almost effortless, thanks to a radiant floor system that draws heated water through loops of cross-linked polyethylene tubing that lie below the floor tiles. To make hot water, the boiler also pumps water to a heat exchanger in a nearby 62-gallon thermal hot water tank. The system is efficient because Dennis's air-sealed water-heater burner and reduced heat loss from the tank. According to Richard Bils, the combined cost for the radiant-floor tank and high-velocity heating system would be \$10,000 to \$15,000 for a house the size of the Gutters'.



FAST FORCED AIR

Encased in insulation, this 3-inch duct has a 7½-inch outside diameter, which allows it to be snaked through wall cavities. That makes installing high-velocity forced-air systems in existing houses relatively easy. With a traditional system, walls must be opened, fitted with much larger ducts and resealed.

NEW IDEAS FOR heating systems are often heralded as major developments when they are really minor tweaks. That's marketing for you. But some innovations don't get enough exposure, which means heating contractors don't learn about them and thus can't make the benefits available to consumers. That may be the case with the type of forced-air heating installed in the Gaudes' home.

The new feature in this system is the high velocity at which it delivers warm air—3,000 feet per second, to be exact, about four times the rate of conventional systems. This does not, it must be said, lead to high, whirling winds. For your head over one of the ceiling-mounted outlets and you feel a strong, push-a-fun, but it's just a couple of feet-it dissipates to a mild puff. Further away, there's no hint of its source just yet warm.

Nore is kept to a whispery minimum with special sound-absorbing supply and return ducts. Because these ducts have fibrous linings, the system can't accommodate an in-line hand-held fan. What can be included (though it wasn't here) is an electric fan or an electronic air cleaner, an especially good feature for people with allergies or respiratory problems.

Another benefit of this system shows with newer conventional forced-air systems in having less conflict on the ceiling instead of windows, where they can take up valuable space. Also, individual thermostat-controlled dampers allow you to heat each floor separately.

But what may give this system even greater appeal is its cooling ability. In homes with hot water or steam heat—and thus no ducts—high-velocity central air conditioning can be installed with little disruption. The small-diameter ducts can be fed easily through existing walls.

So is high-velocity some kind of a breakthrough? "It's a great, low-impact way to get heating and cooling into new and existing buildings," says Richard, "but, unfortunately, it's also one of the well-kept secrets in our industry."

INSTALLING AN OUTLET DUCT



To bring a warm air outlet into a room, Brian Biss starts by drilling a 4-inch hole through the plaster and into the ceiling.



With a helper pulling from above, he feeds the duct up into the attic. If needed, additional lengths can be coupled on as they come.



The outlet ducts slide right easily into the end of the duct. If they clamped tightly to prevent possible air leaks.



When the job is finished and the outlet is in place, it's barely noticeable. The plastic can also be painted to further camouflage it.

AIR CENTRAL



The units (inset)—which house the heat exchanger and blower in a short-run box—ride in a drain pan suspended from the rafters. This arrangement, with the addition of a few rubber pads, minimizes vibrations that would become noise in downstairs rooms. If the Gaudes ever want central air conditioning, a cooling module can be added with a simple system of clamps and gaskets.



Raised 12 feet



Raised 11 feet



Raised 20 feet



Raised 20 feet



Raised 10 feet



Raised 14 feet, 6 inches



Raised 8 feet



The Queen house, raised 6 feet, 6 inches

W L E T T H E R I V E R R U N

but you don't expect is the sound, the collective groan of the joist and studs, as a house is wrenched free of its foundation and begins its upward climb. The speed with which the house rises—five to five feet a day—is a surprising too. Something is heavy, it seems, should take longer to lift.

What's the pain right now, close to 150 houses in Northern California's Sonoma County have made such a climb, riding on hydraulic jacks as much as 23 feet from ground level to get out of the path of the nearby Russian River's flood waters. Once raised, the houses look casually and calmly, sitting on tall wooden piers like shompo-legged teenagers. Simply attaching the front door often requires climbing dozens of stairs.

In Guerneville (population 6,000), flooding has become a way of life. Barbara Coon, who's lived here for 12 years, is meters-of-feet about the misery itself that prevents her house and the furniture that's been raised with each successive deluge. She points to a pale streak that runs westward on the wood paneling around her living-room walls. "That's where the water came up to last time," she says. Similar marks on the walls of the kitchen show that the water was well over the countertop. "We could have ridden around our house in a rowboat."

The Russian River reached its "300-year flood" level in 1986 and came close twice last

winter. Floods severe enough to evict residents have occurred on average at once a year for the past 30 years. And everyone—from the homeowners who suffer thousands of dollars in damages and spend weeks cleaning and drying out their belongings, to the Federal Emergency Management Agency officials who shell out millions of dollars in compensation—a sick of it.

Last winter, the area was hit with heavy rains that caused two record-setting floods within two months. The same rains soaked the crews working on last season's Duffy house in Napa, about 45 miles east. As a result, Sonoma County passed an ordinance requiring the owners of homes that

were damaged significantly in these floods to raise them one foot above flood level. Low cost loans and government money is available to help offset costs, which for most houses run upwards of \$40,000, according to Ed Scott, manager of the county's building permits division. Only about \$7,000 of that goes into actually lifting the house. The real expense comes in building a new foundation, setting piers, finishing off the space (typically with cheap plywood, since sheetrock is too good to be raised in the next flood) and repairing the inevitable rot. For other years of starting over after each inundation, the Coons and the other families who live in the area's path know they'll have homes that will stay dry when the water comes full.

ALSO PHOTOGRAPHED BY LESLIE FLORES FOR THE SAN FRANCISCO CHRONICLE



RAISING A HOUSE



Barbara Cook's house sits on a strap-and-buttress scaffolding the Passaic River. During the flood last winter, water covered the dining-room table. Raising the house 8 feet and a half foot will put it 1 foot above the 100-year flood level.



The first inches of the lift are the most crucial. All the construction that lifts the house to the foundation should be secured before the procedure begins. But there are often upsets that stick.



Nails are jacked-inward in the foundation wall so that 8-by-16-inch timbers can be slid under the house, perpendicular to the floor joists, to support the structure as it begins its upward climb.



Archie Harris of A.C. House House Movers in Windsor, California, monitors pressure gauges to make sure the jacks, which carry different amounts of weight depending upon where they're located, are lifting at the same rate.



Gridding timber is ready for stacking beneath the house.

Workers, posted around the house, communicate by walkie-talkie.



Hydraulic jacks (12 were used here) hold the house 1 foot at a time. Gridding is stacked around the jacks to support the house, then the jacks are reset to lift the house another foot.



The stack of gridding grows as the house rises. The house remains on the gridding for two months while a new foundation is poured and wooden piers are set. Then A.C. House returns and lowers the structure onto the new foundation.



Because of the size of the Green house, the jacks were augmented with air bags. The jacks and air bags must be synchronized to move at nearly the same pace. If one jack or air bag is off by as little as an inch, the house will pitch and creak.



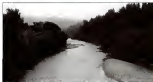
The initial lift takes only 8 minutes per foot, but resetting the jacks and stacking the gridding requires more than an hour. The Green house took two days to lift to its new height, rising 2 feet on the first day and 8 feet, 6 inches on the second.



The Green house now stands a full story taller. The newly secured space allows the house will become a garage—eventually custom-provided homeowners from converting it into living space. The family moved back in as soon as the wiring and plumbing were reconnected, giving a better life to the old and the new.



The A.C. House company's business is booming. Before the floods, they lifted 12 houses a year; last year they lifted 55.



WHY DO PEOPLE LIVE BY RIVERS THAT FLOOD?

The answer is economics. Lumberville, Pennsylvania, State 5th and the other small towns along the Susquehanna River were once retreats for the Pennsylvania who traveled the river to fish, hunt and swim in the slow-moving waters. Most of the houses were summer cottages—cramped and flimsy. If they flooded during the winter, so did much more. But as Lumberville real estate prices soared and Susquehanna County became a more desirable place to live, residents winterized the cottages and started occupying them year-round. Because the houses are used and prone to flooding, they remain affordable. For the opportunity to live by the river all year long, residents take their chances with the water risks.

REPRODUCTION FLOOR COVERINGS FROM A 160-YEAR-OLD FACTORY

carpets

BY STEPHANIE WOODARD
WITH REPORTING BY BRUCE IRVING

PHOTOGRAPHS BY RORY CARNEGIE

Bare wood floors were typical in all but the finest early American homes, it wasn't until after the Revolution that the former colonies began to get cozy. The most desirable carpets came from English manufactur-



ers like Woodward Greenman, founded in 1790. The mill remains active today, producing the British carpeting that Kevin and Deborah Gurnea are installing in their *The Old House* restoration, as well as Wilson and Axminster goods (see Glossary, page 83).

With the invention of steam-powered carpet looms in the 1840s (by an American, Francis Englelew), production on both sides of the Atlantic increased and prices came down. The Industrial Revolution provided not only the means but the market—a burgeoning middle class that desired stylish home furnishings. The covered floor became the rule rather than the exception.

Wall-to-wall carpets—which we usually think of as a modern innovation—was the norm until the late 1900s, when area rugs were often used to set off the fancy hardwood floors then in fashion. Unlike 19th-century floor covering of any type has survived, but old-house owners who want a correct period look can have accurate reproductions made. Last year Woodward Greenman wove about 10,000 square yards of reproduction goods (double the amount of 10 years ago, says export director Brian Moorman), more than half of which made its way to the United States.



Left: Woodward Greenman's main factory building, built in 1855 to house the first steam-powered looms in the north England city of Kildersleepe, is part of a 5-acre complex.



Acacia Regency Floor, a circa-1880 carpet pattern from the mill's archives. It will be reproduced (in slightly altered colors) for Kevin and Deborah Gurnea's house in Seale, Manchester. Left: Yarn arrives at the mill.

RIGHT: BEST PHOTOGRAPH BY JAMES WOODARD

Tough, resilient yarn—made in Scotland and dyed here from the wool of mountain sheep—is dyed in vats. A former worker's sample of each dye lot is Woodward Greenman's design department, where it is checked against the patterns from which the carpet will be woven.



A large, moss-covered tree trunk in a forest, with a person standing next to it for scale. The forest floor is covered in moss and fallen leaves. The background shows more trees and a cloudy sky.

cedar siding

From the forest
through the mill

by Thomas Baker

Photographs by P. to Eckert



Above: A grapple yarder drops felled logs to the road, where they are taken by truck to the sorting yard. **Below:** The butt end of a more than 200-year-old log shows the rotting center characteristic of old cedar trees. Even so, plenty of good wood can still be milled from this "crotch" (snarlunkhead) log.



THE CATHEDRAL-LIKE SURFACE of the British Columbia forest is sheltered to logger Jack Currie from up his Hingpania chain saw. The object of his attention—a Western red cedar four feet across—has stood on the spot for more than 200 years, surviving fires, windstorms and insect attacks. It will take just 20 minutes for Currie to make the undercut and back cut that will lay the 130-foot giant.

For 1,000 years, Western red cedar (*Thuja plicata*) has been growing along the coast. Images of the Pacific coast from northern California to southern Alaska, and inland to the western slopes of the Rockies. Under ideal conditions, a red cedar can live 1,000 years or more and reach heights of up to 230 feet. The canoe people of the Pacific Northwest built houses and canoes with this evergreen's aromatic wood, turned its shaggy gray bark into clothing and medicine and made baskets with its rough cones. So valued was the red cedar that they called the tree "Long Life Maker."

Modern builders also value red cedar's cinnamon-colored, straight-grained wood for its ability to withstand weather, rot and pests. Though its soft, open-celled structure makes cedar less than ideal as a framing material, it's perfect for shingles and cladding, for lining houses or for decking and exterior trim.

From these old, slow-growing trees also comes the clear, fire-grained heartwood so prized for cedar siding. Because of its high concentrations of thujaplicin, a natural fungicide, the wood is incor-

Trunks felled from the shore exit to the deep-laid sorting yard, where each log is sorted, graded and sorted by species. The stacks in the lower working alongside of the yard, waiting for trucks, left, and dropping log bundles into the water, below, to be towed by tugboat to the mills.



usually hard. Sound cedar trunks have been found on the forest floor 100 years after they fell.

His cutting finished, Currie goes inside his saw and inserts a pair of plastic wedges into the back cut. Four or five solid wedges web the back of his ax and the old tree trembles, cracks and falls in a swirling rain that shakes the earth.

Taking a measuring tape, Currie climbs up onto the felled trunk and begins cutting off branches and "burling," or notching, the log into the 40-foot lengths preferred by the mill. It will take him and his crew a few days to cut down every tree in the due area. Then a grapple yarder and loader will collect the felled logs and pile them on trucks for the trip down the Squamish valley to the dry-laid sorting yard.



boats for towing to the mill on the Fraser River.

More than 7 million cubic meters of cedar are harvested in British Columbia every year. At the highly automated Homestead Cedar Mill we visited, 2,200 cubic meters of logs are processed each working day inside the mill, heavy with the spicy scent of cedar, the log is stripped of its shaggy bark and rolled down a ramp to the head rig. Essentially a sophisticated band saw, the rig slices round logs into flat boards.

At its controls are the chief sawyers, who manipulate ruby laser beams to illuminate where each cut will be made. He lines up the log on a sliding carriage, then runs it through an eight-foot-long, steel-tipped blade racing at 12,000 feet per minute. He'll flip the log a couple of times to leave out as much desirable vertical grain material as possible.

Each pass through the head rig produces a case—a slab of wood 4, 6, 8 or even 12 inches thick. Close (knot-free) cants and those with only tight knots slide down to the gang edger, which cuts each case into as many as two dozen 1-inch-thick boards destined to become bevel siding—a.k.a. clapboard.



A carriage slices each block, as the skidded log is called, past the blade of the head rig. The steel sawyer uses lasers to guide each cut, producing longboard siding, or cants.



The extra value for siding can offset again into blocks on a machine called a gang edger. Its rack of multiple slender saws can produce as many as 24 blocks in one pass.

Now under blocks are stacked onto edging racks, then dried in a kiln for two days. After cooling in a covered shed, the racks of seasoned boards are ready to be milled into siding.



A massive log thumps through the 5-foot-diameter maw of the debarking machine, which shaves off the bark. Any bark without harming the wood, nothing is wasted in milling cedar. Bark, chips and sawdust are taken to a pulp mill, where they will be turned into paper, while scraps are burned to heat the drying kiln.

The blanks are steam-dried to a kiln for five days, then cooled. Kiln-dried, "seasoned" siding costs more than green or unseasoned wood but is much less likely to shrink or warp after it's installed.

The dried blanks are next fed through a lathe blade planer spanning at 3,600 revolutions per minute. The planer surfaces (sanded) both faces and planes a groove along both edges. The blank then passes through the sander, which, using the grooves as guides, slices it at an angle into two tapered halves, each with one smooth (planed) face and one rough (sawn) face. Every piece of siding is then graded and sorted according to grain pattern and defects before being wrapped and shipped to lumberyards around the world.

Within the past, the clearance from which the cedar was taken will be replanted or allowed to regenerate not only "second-growth" trees will reach harvestable size in 60 or so years. But it's doubtful such trees will yield wood of the quality found by logger Jack Corrie.

"I'd be lying to you if I said the trees from a 60-year stand have the same quality as 130-



year-old trees," says Gordon Foxcroft, a planning forester with Lingco Logging in Squamish. With only enough old growth left for another 30 years of logging, according to the Ministry of Forests, prime order lumber is going to become an ever more scarce—and more expensive—commodity.

Lingco Planted and edge-grooved cedar blanks are sized up on a conveyor, ready to be resawn into bevel siding. As well, the blank cuts the resin on two sides, vertical grooves, 8-inch edge boards, worth about \$1.50 a board foot in the United States. This resin, one of two at the mill, produces 35 megawatts every minute; \$5,000 board feet every day—enough to slide about 24 four-lane highways.

SIDING CHOICES

Cedar siding comes in two basic varieties: bevel siding, in which boards are sawn to create a tapered profile, and pattern siding, where the face of the board is milled into a desired shape or pattern. With bevel siding, weather-lightness comes from each board being overlapped by the one above. On pattern siding, the edges of the boards are milled so they interlock with either tongue-and-groove or lap joints. Both types of siding come with a smooth (planed) face and a rough (sawn) face. Bevel and pattern sidings are graded at the mill based on the defects and grain patterns in the wood. Grading for bevel siding is commonly done on the smooth side, so expect more defects if you plan to install it rough side out.



bevel siding/vertical-grain boards



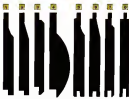
wavy-edge bevel siding/wavy boards



tongue-and-groove (planed) siding/planed boards



shiplap (lap) siding/proprietary grade (sawn)



Pattern siding (with milled faces) is either lap or tongue-and-groove. Lap siding (1 through 4) are milled to overlap the adjacent piece. For tongue-and-groove siding (5 through 8), the groove interlock. Patterns are identified by standard names or numbers: 1: #100; 2: #101; 3: #102; 4: lap siding; 5: #103; 6: #104; 7: #105; 8: standard milled tongue-and-groove.

CEDAR'S FUTURE

Will there be cedar forests, and cedar lumber, in our future? In British Columbia, it's a question being asked with increasing urgency by environmentalists, by the cedar industry and by the provincial government. With the destruction of old-growth cedar forests in the United States and subsequent loss on logging on public land, British Columbia now has the world's largest remaining reserves of mature Western red cedar stands, an estimated 1.1 billion cubic yards. The province is trying to exploit and protect that resource at the same time.

Unlike in the United States, where 38 percent of forests are publicly owned, nearly 94 percent of British Columbia's timber is on lands controlled by the provincial government. Logging companies are granted long-term timber harvest licenses, and the government takes an active role in making sure its forests are properly managed. A new forest practice code specifies what logging operations are required to do, including submitting detailed plans to public scrutiny, timing the time, shape and location of clear-cuts and protecting watersheds and wildlife habitat. The code also defines how logging roads should be built and removed and specifies a company's role in replanting a logged site. Staff inspectors are mandated for hiring to comply. The government runs a central seed bank and experimental nursery for cedar and other trees. Up to 12 million nursery-raised cedar seedlings are replanted each year, and 65 percent survive. In short, the new code is one of the world's most progressive forest-management policies.

So while it is clear there will be cedar forests in the future, they will be different from the towering stands George Vancouver saw in the 18th century. Most will be young and so intensively managed and maintained as a field of corn. The majestic old forests will remain too, albeit in much reduced and fragmented areas, such as parks and provincial reserves.

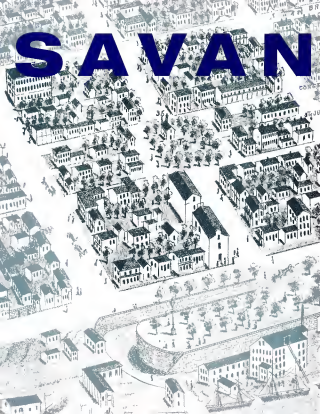
A young stand grows on a site clear-cut a decade earlier. In 30 years, it will likely be harvested again.



Millions of cedar seedlings are raised in nurseries for replanting logged areas around British Columbia.



SAVANNAH GA



By Jeanne Huber

Color Photographs by Chris Sanders

Black and White Photographs by Dana Gallagher

Overlook Jan. 1971 Midway view of Savannah highlights the basic town plan, a network of linked squares.

Left: The city got rich as a million port in the 1900s; container ships still pass by the riverfront park.

In every square, around every corner, Old Savannah delights. And perhaps no one is more pleased with it right now than Milla Fleming, a young attorney whose roots in the city go back five generations. After months of house-hunting (a chore that fell largely to him because his physician wife, Marianna, was so busy), he found the home of their dreams: an 1884 townhouse with its historical charm intact.

True, it needs some updates, but The Old House is arriving soon to help out. And Fleming refuses the chance to show the rest of the country his own neighborhood, the two square miles that make up Old Savannah. There, most streets meander around parks draped in Spanish moss, past grand churches and houses decorated with intricate ironwork. It's like a great painting, Fleming says. "You always see something new, even if you've looked at it a million times."

The 17-blocks' new home faces Monterey Square, perhaps the prettiest of the 21 squares in the downtown

historic district. And it was directly across from Mercer House, one of the looser tourist attractions as town dwellers to John Berendt's best-seller, *Midnight in the Garden of Good and Evil*. The block is both a chronicle of the four corner made of Jim Williams, an antique dealer who he owned the mansion to Southern Accountant, and a character study of the town—"a love story to Savannah," says local historian John Dacosta, who lives across the square. Berendt, a magazine writer from New York City, happened on Savannah in the early 1990s. He was so charmed that he eventually moved there, with no plan



An 1820 map shows Savannah's street plan: a central square, 4 "trust" lots for public buildings, 42 "tying" lots for houses.

other than to poke around and "take notes."

The city's image, Berendt says, is that "Savannah is just Savannah. There's a very serene feel to it." Distinct personalities develop and are treasured, making the city most interesting and, indeed, a favorite pasture. "People love to gossip," he says.

In Old Savannah, houses are laid out in a way that encourages a sense of community—and makes it easy to keep track of what neighbors are doing. Where other cities square houses to be set back from the street, here they are right out front, often with many steps cascading onto the sidewalk. From a window, it's easy to see neighbors walk by. No house is more than two blocks from a park. And instead of zoning out anything but single-family houses, Savannah favors bookstores, antique shops, restaurants and other gathering spots to be tucked in under living quarters, in the ground-floor "housewares" once devoted to hot kitchens stores.

That so many neighborly facades can be packed into a town plan is amazing, especially since the basic form of this area was drawn up in 1733. Savannah's downtown historic district is a series of opposing wards. At the center of each ward is a common open area, surrounded by blocks of 60-foot-wide lots. On the east and west are deep "trust" lots for churches and other public buildings, north

and south are rows of shallower "tying" lots for houses.

With all house lots the same size, the plan fit the utopian ideals of the city's founder, James Oglethorpe. An English Parliament member and prison reformer, he envisioned the city as a refuge, a place without slavery, alcohol, speculation, religious persecution or marked class differences.

Much of the idealism fell by the wayside as the city grew—the ban on slavery was relaxed in 1750. But the plan survived because its demands could adapt with the times. The squares, originally intended to house rural colonists in time of attack, serve today as leisurely suburban urban parks.

The 60-foot-wide lots were gradually subdivided, but because few were made larger, a great variety of building styles exists today in harmony. And because all house lots were laid out with a narrow street in back, Savannah has accommodated the automobile with unusual grace. Garages open onto these back "lanes," leaving the main public streets beautifully devoid of them.

On the streets bordering each ward, traffic flows freely, in down to a hazy head-bobbing interior streets, with frequent stops and turns required to get around the squares, are for strollers, bicyclists and drivers enjoying the scene.

Stroll up Ball Street, which starts at the Savannah River and ends just beyond Monterey Square, and you'll experience what the city is all about. "There's this wonderful rhythm of enclosed and open parts," says landscape architect Lisa Colwell. "It's enclosed where the [Savannah River] is, open where the [Monterey Square] is."

How Savannah fought to save itself

Savannah's downtown may be a great place to live now, but it won't have come to life again.

The city once had 34 squares; three were destroyed in the 1820s to make way for a highway that never materialized. Many cheap old buildings were knocked down to make way for parking lots or simply to get at their beds. Others became fire, and many apartments.

When the city's first Federal-style house was in its heyday for a parking garage in the 1950s, the local preservation movement was born. The Historic Savannah Foundation, founded in 1954, raised more than a decade later when it set up a revolving fund or it could purchase and resell endangered properties.

Downtown got a big boost about 45 years ago, when the Savannah College of Art and Design opened. Instead of building a campus, the school bought and fixed up big, vacant buildings throughout downtown, a former elementary school, an abandoned power station, a cotton warehouse. The college, which offers courses in historic preservation, gave its new construction crew to build down north.

Students often use the city for their classes; today, they study a church. Many residents say having students out and about at all hours makes the streets safer for everyone.



SAVANNAH'S DOWNTOWN IS A MIX OF HISTORIC AND MODERN ARCHITECTURE.





10 WEST
TAYLOR
STREET

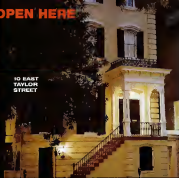


4 WEST
TAYLOR
STREET



2 EAST
TAYLOR
STREET

OPEN HERE



10 EAST
TAYLOR
STREET



3 WEST
GORDON STREET

MONTEREY

a guide to

S Q U A R E

S A V A N N A H , G E O R G I A



1-3 EAST
GORDON
STREET



20 EAST
GORDON
STREET



12-14
EAST
TAYLOR
STREET



erey tnc cut here



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Monterey Square

At the edge of Old Savannah,
a neighborhood intact from the 1800s

4 WEST TAYLOR STREET

This simple but elegant Greek Revival house was built in 1820 of "the best Philadelphia pressed brick," as noted in an 1827 real-estate advertisement. For half a century, it's been home to northwest John C. Lafferty. The house and side porch are made of brick. The house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style.



3 EAST

TAYLOR STREET

built in 1820 for Hugh M. Green, the house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style. The house is a fine example of the Greek Revival style.



10 WEST TAYLOR STREET
Also built in 1923, this house used to be as small as the Luffly house next door. It turned the corner owner's idea of a small house into a two-story, light-colored, Mediterranean-style house with a tiled roof. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony.

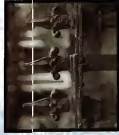


423-425 BULL STREET

This double house, among the most photographed in the city, is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony.



This double house, built in 1923, because for many people was a good first and second floor. The house was added to the list of historic houses in the city. It has a tiled roof, a small tower, and a small balcony. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony.



429 BULL STREET

The copy of the house "Surrender" is very different from the original. It has a tiled roof, a small tower, and a small balcony. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony.



7-8 WEST GORDON STREET

This 1923 house was built by the same architect as the house next door. It has a tiled roof, a small tower, and a small balcony. The house is a good example of the "Spanish" style that was popular in the 1920s. It has a tiled roof, a small tower, and a small balcony.

9 WEST GORDON STREET

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20 EAST GORDON STREET

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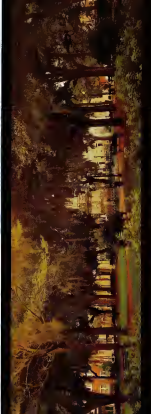
around Ford families. The windows from 1918 to 1920 are still there, and the car has the 1920s look. The car was restored in 1999, and the windows were replaced in 1999. The car was brought from the North at 100 miles an hour. It was restored in 1999.



1-9 EAST GORDON STREET

For centuries, Savannah has been called "The City of the South." But the city's name is not just a nickname. It's a reflection of the city's history. The city's name is a reflection of the city's history. The city's name is a reflection of the city's history.

Savannah has a way of scrambling its historical references, and Monterey Square is no exception. It was named for a city captured by General Zachary Taylor during the Mexican-American War. But its centerpiece is a monument to Caesar Pulaski, a Polish nobleman and Revolutionary War hero for whom a different Savannah square is named. A hard drive is under way to restore the 85-foot-tall monument, which started shodding parts several years ago. The top is now cloaked in netting to protect passersby from injury.



Roots Pedestrians enjoy Savannah because the scene changes constantly. Facing the historic mission, one of the oldest in the city, this street has just glassed windows in a shop sheltered by the historic brick iron balcony. Monterey Square is just ahead.

Burns The city stepped down on its street from house and allows only those that are quiet and relatively nonpolluting. "It's saved the city," author John Burnet says.



With help from This Old House, Mills and Mayenne Planning will update a few 18th-century houses. Plans include new bathrooms, a heating and cooling system and a new kitchen/family room—all changes that should keep their name alive forever.

(Continued from page 89) houses are—you find sort of one-of-a-kind—and then you walk into the square of the square. And you experience the opening and closing of the town over and over as you walk through. People say the squares are outdoor rooms, but it's much more than that. This is really an urban thing. The town is not only for individuals to enjoy, but to encourage that idea of community."

Despite the plan's genius, nobody but Ogilvie used it. Harriet Mills Lane says that's because people who had no cars rarely passed through Savannah. Not so today. Town planners look around the world come to study this useful example of what's now called "new urbanism"—city design that helps people connect with one another. Mixed zoning, human-scale architecture, pedestrian-friendly streets—Savannah understood it long ago.

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save this old house

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LOCATION

427 Riverside
Ave., Westport,
Connecticut

Located near the
Seaport Race in
one of Connecticut's
premier shoreline com-
munities, this 1980
Italianate Victorian
faces a grim end—
working by the fire
department—unless
a buyer is found to
rehabilitate it. The 2,800-
square-foot house,
on land destined to
become a town park,
has been vacant for
10 years. It is almost
completely gutted and
has no submerge-
ble heating or plumbing.
Westport officials are
also willing to sell
the house with a half-
acre lot (pre to be
determined) and allow
it to remain, but they
first need a proposal
to rehabilitate the
structure to a residence
or to lease business.
Zoning approval
would be required.

CONTACT

First Defendant
Joseph P. Amato
Yours (86)
110 Myrtle Ave.
Westport, CT 06890
203-226-8011

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that should be saved and
have evidence of its
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A porch port is missing and the
pine floorboards were stolen, but
the dwelling remains vacant.



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could look like if it were moved to a more handle setting and made double again.



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